SLV-286EE/436EE/X311PS/SG/ X711AS/ME/NZ/PS/SG
RMT-V132J/V141K/V148M

SERVICE MANUAL

East European Model
SLV-286EE/436EE

E Model
SLV-X311PS/X311SG/X711PS/X711SG

Australian Model
SLV-X711AS

New Zealand Model
SLV-X711NZ

ME Model
SLV-X711ME

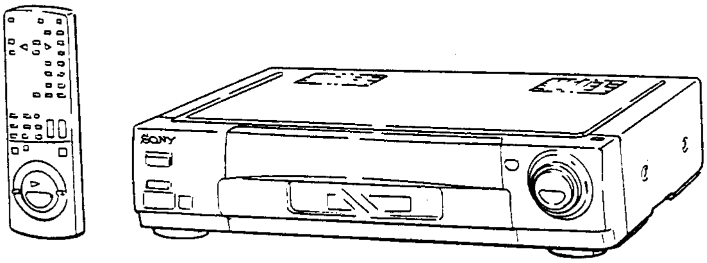

Illustration: SLV-X711

- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENTS Ⅲ for MECHANICAL ADJUSTMENTS. (9-973-211-11)**

VHS
PAL NTSC

SPECIFICATIONS

System

Channel coverage
East European:
VHF R1 – R12, E2 – E12
UHF E21 – E69
CATV S01 – S05, S1 – S41
E, ME, New Zealand:
VHF E2 – E12
UHF E21 – E69
CATV S01 – S05, S1 – S41
Australian:
VHF E0 – E11
UHF E28 – E69

RF output signal
Except Australian:
UHF channels 30 – 39
Australian:
VHF channels 0 or 1

Aerial out
75-ohm asymmetrical aerial socket

Inputs and outputs

LINE IN
VIDEO IN, Phono jack (1)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN, Phono jack (1)
Input level: – 7.5 dBs (0 dBs= 0.775 Vrms)
Input impedance: more than 47 kilohms

LINE OUT
VIDEO OUT, Phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO OUT, Phono jack (1)
Output level: – 7.5 dBs (0 dBs= 0.775 Vrms)
Output impedance: more than 47 kilohms

General

Power requirements
East European:
220 – 240 V AC, 50Hz
E, ME, New Zealand:
110 – 240 V AC, 50/60 Hz
Australian:
240 V AC, 50 Hz

Power consumption
19 W

Operating temperature
5 ℃ to 40 ℃

Storage temperature
– 20 ℃ to 60 ℃

Dimensions
SLV-286EE/X311:
Approx. 355 × 100 × 378 mm (w/h/d)
including projecting parts and controls
SLV-436EE/X711:
Approx. 430 × 100 × 378 mm (w/h/d)
including projecting parts and controls

– Continued on next page –

VIDEO CASSETTE RECORDER

SONY®

MICROFILM

Weight

SLV-286EE/X311:
Approx. 4.7 kg
SLV-436EE/X711:
Approx. 5.1 kg

Supplied accessories

Remote commander RMT-V132J
(SLV-286EE/X311PS/SG)
Remote commander RMT-V141K
(SLV-436EE/X711ME/PS/SG)
Remote commander RMT-V148M
(SLV-X711AS/NZ)
R6 (size AA) batteries (2)
Aerial cable (1)
Mains lead (1)
Plug adaptor (1)
(E, ME Model)

Design and specifications are subject to change without notice.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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SERVICE NOTE

1. TAKING OUT CASSETTE WHEN THE UNIT IS DEFECTIVE WITH CASSETTE IN

1) Remove the upper case, the front panel assembly and the bottom plate.
2) Turn the loading pulley in the arrow Ⓐ direction and the clutch pulley in the arrow Ⓑ direction simultaneously to return the loading block assemblies and to wind up the cassette tape.

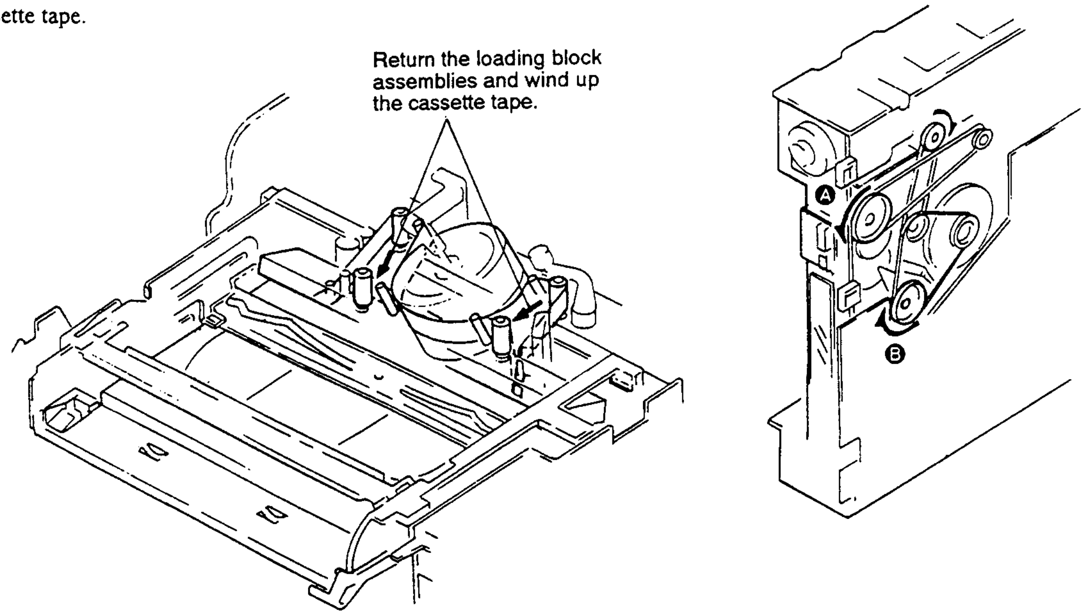

Return the loading block assemblies and wind up the cassette tape.

Fig. 1.

3) When the loading block assemblies reach the initial positions, the loading pulley stops turning.

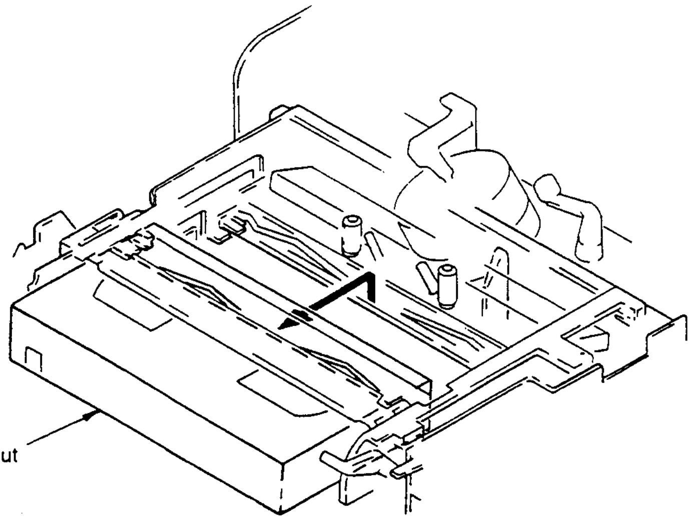

Cassette goes out

Fig. 2.

4) Keep turning the clutch pulley in the arrow Ⓑ direction the cassette goes out.

Note: When performing 1., be careful not to clog and damage the cassette tape.

2. UPPER DRUM REPLACEMENT

2-1. Removal of Upper Drum

1) Remove the screw ❶ (2.6 × 3) and take out the SD ground assembly ❷. (See Fig. 3.)
2) Completely remove the rotary upper drum board and desolder the soldering indicated by the arrows.
3) Remove two screw ❸ (PSW3 × 8) and take out the rotary upper drum in the arrow direction Ⓐ. (See Fig. 4.)
   If it difficult, remove by shaking the rotary upper drum gradually.

Note: If the drum can not be removed, check wheater the solders have been removed or not again.

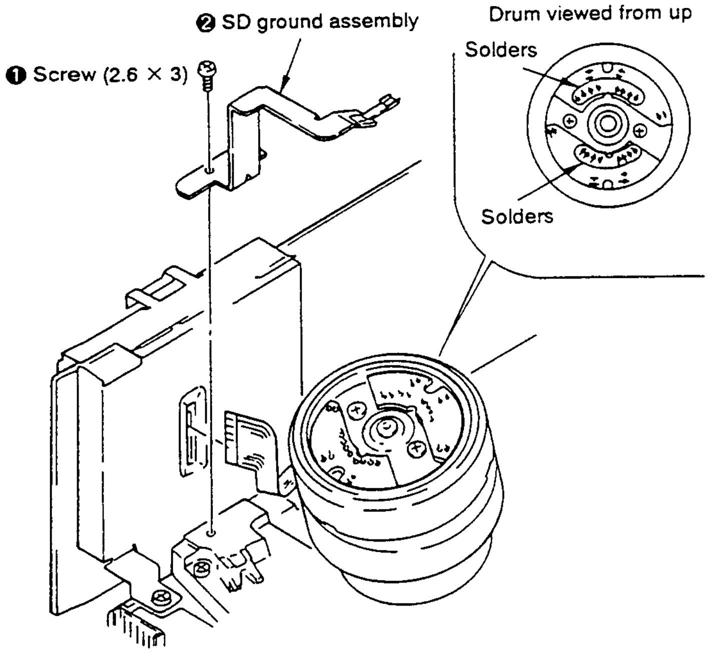

❷ SD ground assembly
❶ Screw (2.6 × 3)
Drum viewed from up
Solders
Solders

Fig. 3.

2-2. Mounting Upper Drum

1) When inserting the rotary drum into the lower drum, be careful not to blur the contacting surface with fingerprint or the like.
2) Mount the rotaly upper drum board by aligning marked ➡ with marked ⇛ of rotary transformer board (lower drum) so that the screw holes of both upper and lower drums match. (See Fig. 4.)
3) If it is difficult, mount the upper drum by shaking it gradually.
   Note: Be careful not to damage the head. Make sure that the upper drum is tightly inserted.
4) Tighten two screws ❸ (PSW3 × 8). (See Fig. 4.)
   Note: Temporary tighten two screws. After making sure that upper drum is tightly inserted, tighten the screws.
5) Solder points on the board of the rotary upper drum.
6) Fix the SD ground assembly ❷ using the screw ❶ (2.6 × 3) so that the protrusin of SD ground assembly end contacts the center of the drum shaft.
   Note: When attaching the SD ground assembly ❷, be careful not to apply force to the spring section of it.

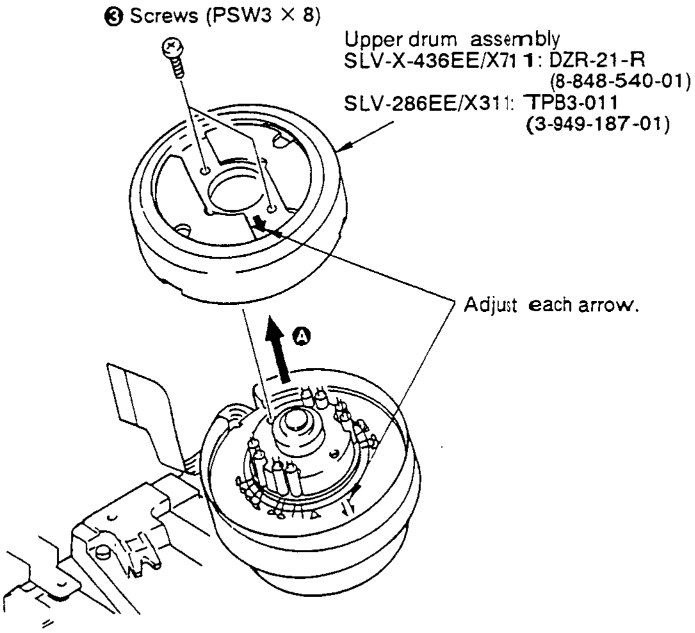

❸ Screws (PSW3 × 8)
Upper drum assembly
SLV-X-436EE/X711: DZR-21-R
(8-848-540-01)
SLV-286EE/X311: TPB3-011
(3-949-187-01)
Adjust each arrow.
Ⓐ

Fig. 4.

SECTION 1 GENERAL

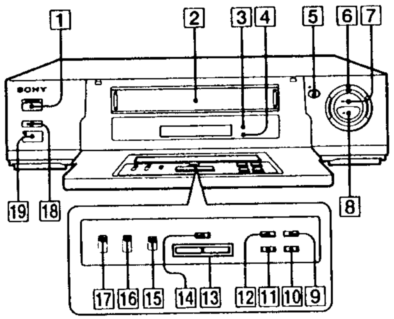
SLV-286EE/436EE/X311PS/SG/X711AS/ME/NZ/PS/SG

This section is extracted from SLV-436EE/X711ME/X711PS/X711SG instruction manual.

Index to parts and controls

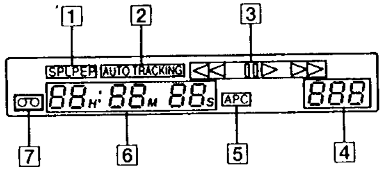
Refer to the pages indicated in ( ) for details.

Front panel



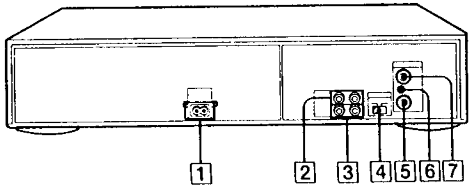
1. ⏻ (on/standby) switch
2. Cassette compartment
3. TIMER REC (recording) indicator (19)
4. REC (recording) indicator
5. ❚❚ PAUSE button (18, 29)
6. DUAL MODE SHUTTLE ring (18)
7. ▷ PLAY button (25)
8. ■ STOP button
9. QUICK TIMER
10. ● REC button (29)
11. TIMER REC (recording) ON/OFF button (19, 21)
12. OPC (Optimum Picture Control) button *(SLV-436EE)* (26)
    APC (Adaptive Picture Control) button *(SLV-X711ME/X711PS/X711SG)* (27)
13. PROGRAM +/– button (9)
14. INPUT SELECT button (8)
15. RENTAL PICTURE ON/OFF switch *(SLV-X711ME/X711PS/X711SG only)* (27)
16. NTSC PB switch (16)
17. COLOR SYSTEM switch (16)
18. ⏏ EJECT button
19. Remote sensor (6)

Display window



1. Tape speed indicators (18)
2. AUTO TRACKING indicator (26)
3. Tape operation indicators
4. Line/programme position indicator
5. OPC indicator *(SLV-436EE)* (26)/
   APC indicator *(SLV-X711ME/X711PS/X711SG)* (27)
6. Time counter/clock (16)
7. Tape indicator

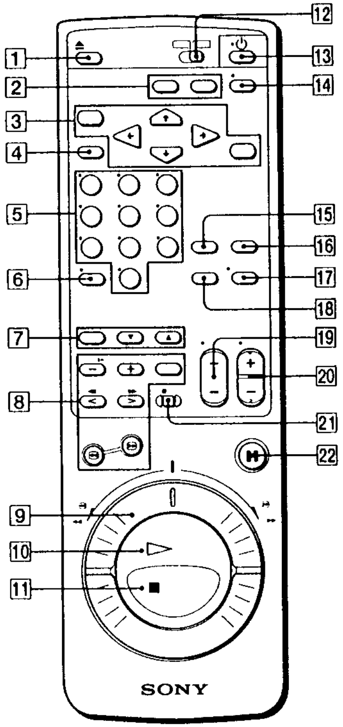
Rear panel



1. AC IN connector (7)
2. LINE IN AUDIO/VIDEO jacks (28)
3. LINE OUT AUDIO/VIDEO jacks (7, 28)
4. TV SYSTEM switch (9)
5. AERIAL OUT connector (7)
6. RF CHANNEL screw (9)
7. AERIAL IN connector (7)

Index to parts and controls
(continued)

Remote commander



1. ⏏ EJECT button (15)
2. TIMER REC (recording) buttons
   CLEAR button (23)
   ON/OFF button (19, 21, 22, 23)
3. Menu operation buttons (10)
   MENU button
   CURSOR buttons (↑/↓/←/→)
   EXECUTE button
4. COUNTER RESET button (16)
5. •programme number buttons (11)
6. •-/- - (ten's digit) button
7. TRACKING buttons
   AUTO/MANUAL button (26)
   ▼/▲ NORMAL/SLOW STILL ADJUST buttons (25, 26)
8. Tape transport buttons
   ❙▶ SLOW +/– buttons (25)
   REPLAY button (25)
   ◀❙❙/❙❙▶ FRAME buttons (25)
   ⏪/⏩ SEARCH buttons (25)
9. DUAL MODE SHUTTLE ring (15, 25)
10. ▷ PLAY button (15)
11. ■ STOP button (15)
12. TV/VTR remote control switch (6)
13. •⏻ (on/standby) button (8)
14. •TV/VIDEO button (6)
15. TAPE SPEED button (17)
16. QUICK TIMER button (19)
17. •DISPLAY button (16)
18. INPUT SELECT button (8)
19. PROG (programme) +/– buttons (9)
20. •VOL (volume) +/– buttons
21. ● REC (recording) button (17)
22. ❚❚ PAUSE button (15)

Welcome!

Thank you for purchasing the Sony Video Cassette Recorder (VCR). Here are some of the features you'll enjoy with your VCR:

- Optimum Picture Control (OPC) (*SLV-436EE*)/Adaptive Picture Control (APC) (*SLV-X711ME/SLV-X711PS/SLV-X711SG*), that automatically optimises recording and playback performance
- Dynamic Signal Filter (DSF) that boosts and stabilises signals
- Dual Mode Shuttle (DMS) ring for easy playback and search operations

Compatible colour systems

- This VCR is designed to record and play back using the PAL, MESECAM, and NTSC colour systems. Recording of video sources based on other colour systems cannot be guaranteed.
- NTSC colour signals can only be recorded through the line input.

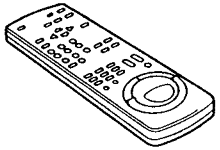
Checking your model name

The instructions in this manual are for the SLV-436EE, SLV-X711ME, SLV-X711PS, and SLV-X711SG. Check your model number by looking at the rear panel of your VCR.
The SLV-X711ME is the model used for illustration purposes. Any difference in operation is clearly indicated in the text, for example, "*SLV-X711PS only.*"

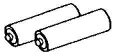
Step 1 Unpacking

Check that you have the following items:

- **Remote commander**

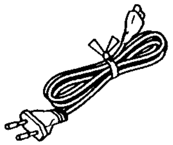


- **R6 (size AA) batteries**

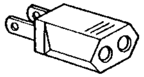


- **Aerial cable**

- **Mains lead**

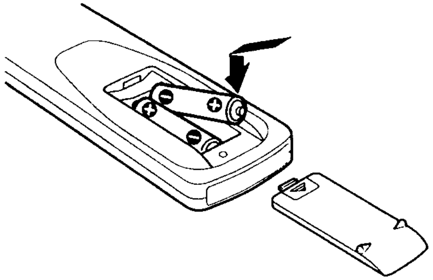


- **Plug adaptor (SLV-X711ME/X711PS/X711SG)**



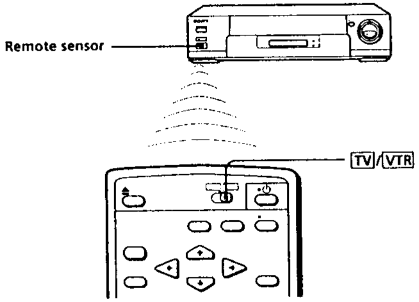
Step 2 Setting up the remote commander

Insert two R6 (size AA) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV. Buttons on the remote commander marked with a dot (•) can be used to operate your TV.

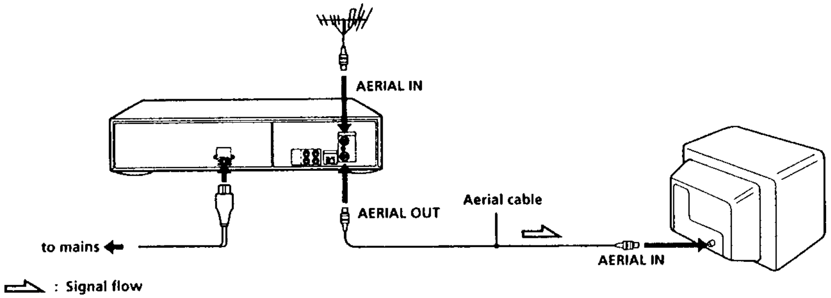


To operate	Set TV/VTR to
the VCR	VTR and point at the remote sensor on the VCR
a Sony TV	TV and point at the remote sensor on the TV

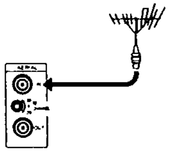
Notes

- With normal use, the batteries should last for approximately three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.

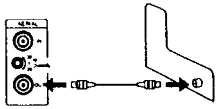
Step 3 Connecting the VCR



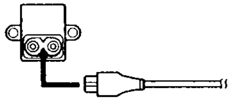
1 **Disconnect the aerial input cable from your TV and connect it to AERIAL IN of the VCR.**



2 **Connect AERIAL OUT of the VCR and the aerial input of your TV using the supplied aerial cable.**

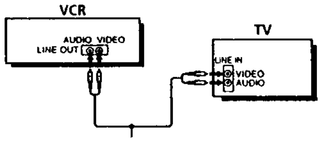


3 **Connect AC IN of the VCR and the mains supply using the mains lead.**
You've completed the basic hookup to watch and record TV programmes.



Additional connection

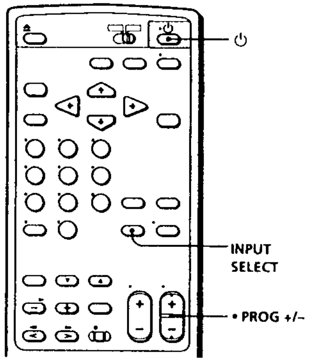
If your TV has phono type audio/video input jacks, this additional connection can improve picture quality. Connect to the TV as shown on the right.



Audio/video cable
VMC-710M/720M (not supplied)

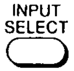
Step 4 Tuning the TV to your VCR

If you have connected the VCR to your TV using an audio/video cable, skip this step.



1

Press ⏻ (on/standby) to turn on the VCR.

2 

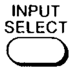
Press INPUT SELECT until "L" appears in the display window.

3

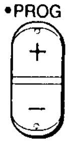
Turn on your TV and select a programme position for video playback. Choose a channel between UHF 30 and 39 on the TV, where there is no picture and no sound or only a steady rustling sound.

4

Tune the TV so that a clear blue screen appears on the TV screen.
Refer to your TV manual for tuning instructions.

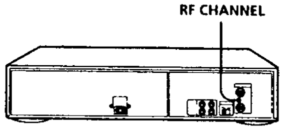
5 

Press INPUT SELECT until "L" disappears and a programme number lights instead.

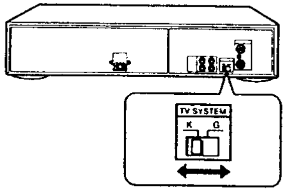
6 

Press PROG +/– to check to see if the TV screen changes to a different programme.
You have now tuned your TV to the VCR. Whenever you play a tape, set the TV to the programme position selected in step **3** above.

To obtain a clear blue screen
The blue screen may not appear clearly in step **4** above. In this case, turn the RF CHANNEL screw at the rear of the VCR with an RF screwdriver, to a position where the TV clearly displays a blue screen.

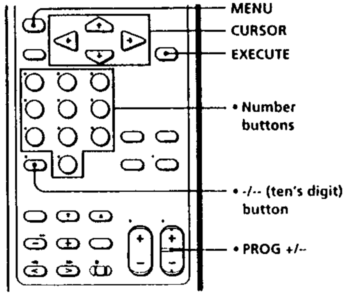


Selecting the TV system
For your TV to receive the correct signal from your VCR, you must set the TV SYSTEM switch at the rear of the VCR to either B/G or D/K. If this switch is set to the wrong position, the sound is distorted.



Step 5 Tuning the VCR to TV channels

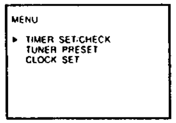
Now you can set your VCR to receive broadcast channels using the on-screen display.



1 MENU

Press MENU.

The following menu appears on the TV screen.

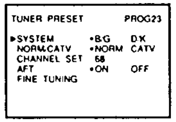


```
MENU

▶ TIMER SET/CHECK
  TUNER PRESET
  CLOCK SET
```

2 CURSOR EXECUTE

Press the CURSOR (↓/↑) buttons to move the cursor (▶) to TUNER PRESET, then press EXECUTE.



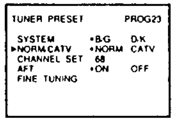
```
TUNER PRESET          PROG23

▶SYSTEM        •B/G    D/K
 NORM/CATV     •NORM   CATV
 CHANNEL SET    68
 AFT           •ON     OFF
 FINE TUNING
```

3 CURSOR

Press the CURSOR (↓/↑/←/→) buttons to move the cursor (▶) to NORMAL/CATV, then move the dot (•) to NORM.

To preset cable TV channels, move the dot (•) to CATV.

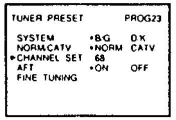


```
TUNER PRESET          PROG23

 SYSTEM        •B/G    D/K
▶NORM/CATV     •NORM   CATV
 CHANNEL SET    68
 AFT           •ON     OFF
 FINE TUNING
```

4 CURSOR

Press the CURSOR (↓/↑) buttons to move the cursor (▶) to CHANNEL SET.

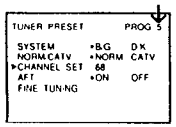


```
TUNER PRESET          PROG23

 SYSTEM        •B/G    D/K
 NORM/CATV     •NORM   CATV
▶CHANNEL SET    68
 AFT           •ON     OFF
 FINE TUNING
```

5 •PROG

Press PROG +/– to select the programme position.



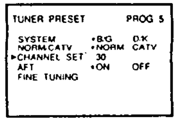
```
TUNER PRESET          PROG 5

 SYSTEM        •B/G    D/K
 NORM/CATV     •NORM   CATV
▶CHANNEL SET    68
 AFT           •ON     OFF
 FINE TUNING
```

6 CURSOR

Press CURSOR → to start tuning.

The VCR starts searching for a channel and displays the first one it finds on the TV screen. Press the CURSOR (←/→) buttons repeatedly until the channel you want is displayed. The channels are scanned in the following order:



```
TUNER PRESET          PROG 5

 SYSTEM        •B/G    D/K
 NORM/CATV     •NORM   CATV
▶CHANNEL SET    30
 AFT           •ON     OFF
 FINE TUNING
```

(SLV-436EE)

D/K TV system		**B/G TV system**	
Channel number in the CHANNEL SET field	**CHANNEL**	**Channel number in the CHANNEL SET field**	**CHANNEL**
2	R1	1	NZ1
5	R6	2	E2
6	R7	3	E3
12	R12	4	E4
13	R2	5	E5
14	R3	6	E6
15	R4	7	E7
16	R5	8	E8
17	R8	9	E9
18	R9	10	E10
19	R10	11	E11
20	R11	12	E12
21-69	R21-R69	21-69	E21-E69
		CATV 1-41	S1-S41
		CATV 42-46	S01-S05

(SLV-X711ME/X711PS/X711SG)

Channel number in the CHANNEL SET field	**CHANNEL**
2-12	VHF 2-12
21-69	UHF 21-69
CATV 1-41	S1-41
CATV 42-46	S01-05

If you know the number of the channel you want, press the number buttons. For two-digit numbers, press the -/- - (ten's digit) button followed by the number buttons.

7 CURSOR

If the TV sound is distorted or noisy, press the CURSOR (↑/↓/←/→) buttons to move the cursor (▶) to SYSTEM, then move the dot (•) to either B/G or D/K, whichever is applicable in your area.

8

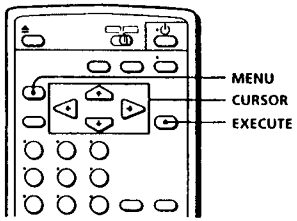
To allocate another channel to another programme position, repeat steps 5 and 6.

9 EXECUTE

Press EXECUTE to store all the allocated channels.

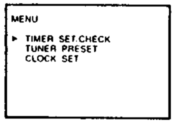
Step 6 Setting the clock

The last thing you need to do is set the date and clock.



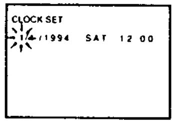
1 MENU

Press MENU.
The main MENU appears on the TV screen.


MENU
▶ TIMER SET/CHECK
TUNER PRESET
CLOCK SET

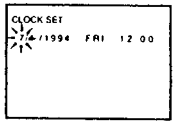
2 CURSOR EXECUTE

Press the CURSOR (↑/↓) buttons to move the cursor (▶) to CLOCK SET, then press EXECUTE.
The CLOCK SET menu appears on the TV screen and the day flashes.


CLOCK SET
1/4/1994 SAT 12 00

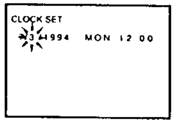
3 CURSOR

Set the day using the CURSOR (↑/↓) buttons.
The day of the week is set automatically.


CLOCK SET
7/4/1994 FRI 12 00

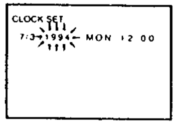
4 CURSOR

Press CURSOR ➔ so that the month flashes and set the month using the CURSOR (↑/↓) buttons.


CLOCK SET
7/3/1994 MON 12 00

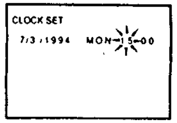
5 CURSOR

Press CURSOR ➔ so that the year flashes and set the year using the CURSOR (↑/↓) buttons.


CLOCK SET
7/3/1994 MON 12 00

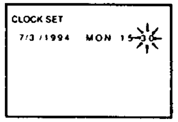
6 CURSOR

Press CURSOR ➔ so that the hours flash and set the hours using the CURSOR (↑/↓) buttons.


CLOCK SET
7/3/1994 MON 15 00

7 CURSOR

Press CURSOR ➔ so that the minutes flash and set the minutes using the CURSOR (↑/↓) buttons.


CLOCK SET
7/3/1994 MON 15 30

8 EXECUTE

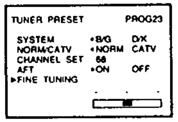
Press EXECUTE to start the clock.
The VCR's display window shows the time set.

Additional tuning instructions

If the picture is not clear

Normally, the Auto Fine Tuning (AFT) function automatically tunes in channels clearly. If, however, the picture is not clear, you may also use the manual tuning function.

1 Press PROG +/– to select the programme number for which you cannot obtain a clear picture.
2 Press MENU, then select TUNER PRESET and press EXECUTE.
3 Select FINE TUNING. The fine tuning meter appears.



```
TUNER PRESET          PROG23

 SYSTEM          •B/G    D/K
 NORM/CATV       •NORM   CATV
 CHANNEL SET      68
 AFT             •ON     OFF
▶FINE TUNING
```

4 Press the CURSOR (←/→) buttons to get a clearer picture, then press EXECUTE. Note that the AFT (Auto Fine Tuning) setting switches to OFF.

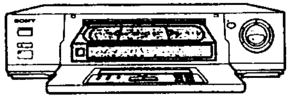
Disabling unwanted programme positions

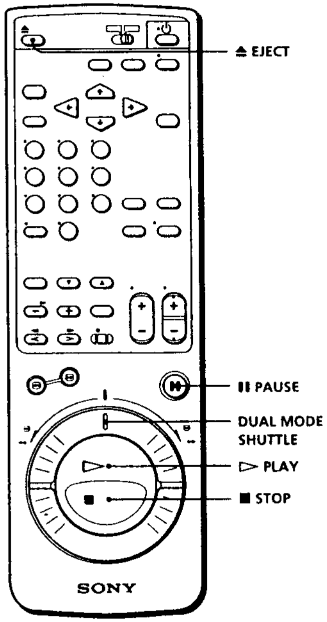
After tuning the TV channels, you can disable unused programme positions. Positions that are disabled will be skipped later when you press the PROG +/– buttons.

1 Press MENU, then select TUNER PRESET and press EXECUTE.
2 Press PROG +/– until the programme position you want to disable appears beside PROG.
3 Press number button "0" twice to display the number "0" beside CHANNEL SET.
4 Repeat steps **2** and **3** for other positions you want to disable.
5 Press EXECUTE.

Basic Operations

Playing a tape





Tip

- For further information on searching and playback functions, see "Playing/searching at various speeds" on page **25**.

This section shows you how to play back a video tape.

1 Turn on your TV and tune in to the VCR:

- If the TV is connected to the VCR using an audio/video cable, set the TV to video input.
- If the TV is connected to the VCR using only the aerial cable, set the TV to the programme position for the VCR.

2 Open the drop down panel and insert a tape.
The VCR turns on automatically. The tape starts playing automatically if its safety tab has been removed.

3 Press ▷ PLAY to start playing.
When the tape reaches the end, the VCR automatically rewinds it to the beginning. (The power remains on.)

Additional tasks

To	Press
Stop play	■ STOP
Pause play	II PAUSE
Resume play after pause	II PAUSE or ▷ PLAY
Search forward	Turn the DUAL MODE SHUTTLE (DMS) ring to ⏩ during playback
Search backward	Turn the DMS ring to ⏪ during playback
Fast-forward the tape	Turn the DMS ring to ▶▶ during stop
Rewind the tape	Turn the DMS ring to ◀◀ during stop
Eject the tape	≜ EJECT

Playing a tape (continued)

Note
- Depending on your TV, the following may occur while playing an NTSC-recorded tape:
  - The picture becomes black and white.
  - The picture shakes.
  - No picture appears on the TV screen.
  - Black streaks appear horizontally on the TV screen.
  - The colour density increases or decreases.

1-8

Notes
- The display will not appear while playing an NTSC-recorded tape.
- The display will not appear during still mode or slow-motion playback.

Notes
- When a tape is reinserted, the counter returns to "0H00M00S."
- The counter will not work on tape portions with no recording.
- If a tape has portions recorded in both PAL and NTSC systems, the time counter reading will not be correct. This discrepancy is due to the difference between the counting cycles of the two video systems.

To set the colour system

If streaks appear during playback, set the COLOR SYSTEM switch on the VCR to conform to the system that the tape was recorded in. (The normal setting is AUTO.)

When your tape was recorded in	Set COLOR SYSTEM to
PAL	PAL or PAL/MESECAM
NTSC	NTSC
MESECAM	PAL/MESECAM

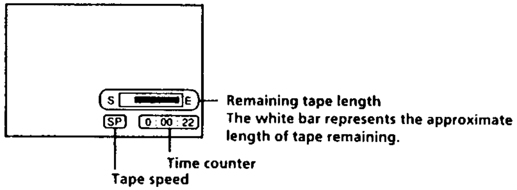
To play an NTSC-recorded tape

Set the NTSC PB switch on the VCR according to the colour system of your TV.

When your TV is	Set NTSC PB to
PAL	ON PAL TV
NTSC 4.43	NTSC 4.43
NTSC 3.58	NTSC 3.58

Displaying the remaining tape length and time counter

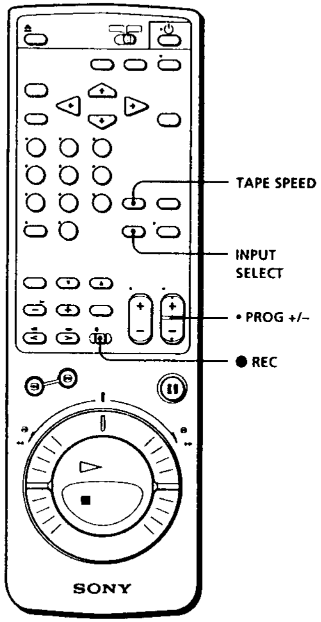
Press DISPLAY to turn the display on or off.


S
E
SP
0:00:22
Remaining tape length
The white bar represents the approximate length of tape remaining.
Time counter
Tape speed

Using the time counter

At the point on a tape that you want to find later, press COUNTER RESET to reset the counter to"0H00M00S." When you rewind or advance the tape to this point, refer to the counter.

Recording TV programmes



Note
- If you insert a tape with its safety tab removed, the VCR starts playing. To record on this tape, cover the tab hole.

Tips
- To select programme positions, you can also use the number buttons on the remote commander. For two-digit numbers, press the -/-- (ten's digit) button followed by the number buttons.
- To record NTSC programmes, connect the TV or other VCR to this VCR's LINE IN jacks and press INPUT SELECT to select line input.

This section shows you how to record TV programmes in the most basic way: manual recording. With manual recording, you start the VCR recording when the programme begins, then stop it when the programme ends. The VCR also provides the following ways of recording:
- Manually start recording, then stop it automatically—"Recording using the quick timer" (page **19**)
- Automatically start and stop recording—"Recording TV programmes using the timer" (page **20**)

1 **Turn on your TV and tune in to the VCR:**
- If the TV is connected to the VCR using an audio/video cable, set the TV to video input.
- If the TV is connected to the VCR using only the aerial cable, set the TV to the programme position for the VCR.

2 **Open the drop down panel and insert a tape with its safety tab in place.**

3 **Press INPUT SELECT until a programme position appears in the VCR's display window.**

4 **Select the desired programme position by pressing PROG +/–.**

5 **Select the tape speed, SP (standard play) or LP (long play), by pressing TAPE SPEED.**
See "To select tape speeds" on the next page.

6 **Press ● REC to start recording.**
When the tape reaches the end, the VCR automatically rewinds it to the beginning.

Recording TV programmes *(continued)*

Tips

- To cut out an unwanted scene while recording, press ❙❙ PAUSE, turn the DUAL MODE SHUTTLE ring on the VCR to rewind the tape to the beginning of the unwanted scene, then press ❙❙ PAUSE to resume recording.
- The display appears on the TV screen indicating information about the tape, but the information will not be recorded on the tape.
- If you do not want to watch TV while recording, you can turn off the TV.

Note

- If you have inserted a tape with its safety tab removed, the VCR ejects it when you press ● REC.

To stop recording

Press ■ STOP.

To select tape speeds

PAL colour system

When recording, select either SP (standard play) or LP (long play). LP provides recording time twice as long as SP. However, SP provides better picture quality. You can mix SP and LP on the same tape. When playing back, the VCR automatically detects the tape speed. See the table below for the maximum recording/playback time in each speed.

Tape type	Maximum recording/playback time	
	SP	LP
E-240	4 hrs.	8 hrs.
E-180	3 hrs.	6 hrs.
E-120	2 hrs.	4 hrs.
E-60	1 hr.	2 hrs.

NTSC colour system

When recording (NTSC colour signals can only be recorded when selecting the input from LINE IN), select either SP (standard play) or EP (extended play). EP provides recording time three times as long as SP. However, SP provides better picture quality. You can mix SP and EP on the same tape. When playing back, the VCR automatically detects the tape speed. See the table below for the maximum recording/playback time in each speed.

Tape type	Maximum recording/playback time	
	SP	EP
T-160	2 hrs. 40 min.	8 hrs.
T-120	2 hrs.	6 hrs.
T-60	1 hr.	3 hrs.
T-30	30 min.	1 hrs. 30 min.

Recording using the quick timer

The quick timer enables you to record for a specified period of time in intervals of 30 minutes. Once you specify the recording time, the VCR automatically stops recording. Before you begin, check that the clock is set correctly.

After you start recording, press QUICK TIMER until the desired duration appears in the display window. The TIMER REC indicator on the VCR lights up. Each press increases the recording duration in increments of 30 minutes as shown below.

→ 0:00 → 0:30 → 1:00 - - - - → 8:30 → 9:00 ┐

The recording duration decreases minute by minute to 0:00, then the VCR turns off automatically.

To stop recording

To stop quick-timer recording while the VCR is recording a programme, press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR.

To extend the recording duration while recording

Press QUICK TIMER until the desired duration appears in the display window.

Watching a TV programme while recording another

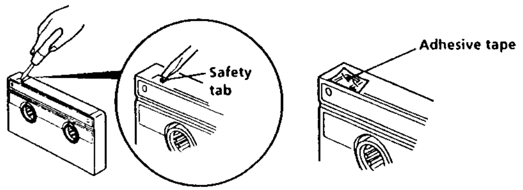
You can watch a TV programme and record another at the same time.

1 If the TV is connected to the VCR using an audio/video cable, set the TV to TV input. If the TV is connected to the VCR using only the aerial cable, skip this step.
2 Select the desired programme position on the TV.

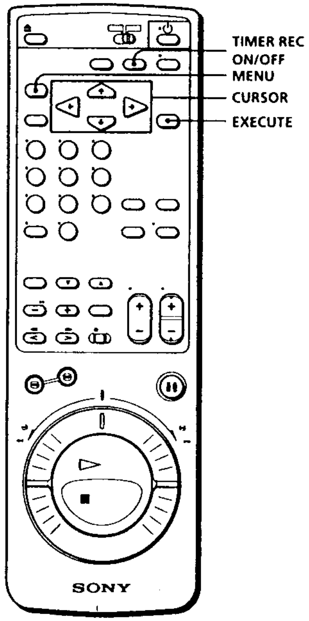
Saving a recording

Video tapes have a safety tab to protect against accidental recording. To prevent accidental erasure of a recording, break off the safety tab with a screwdriver or other tool. A tape with its safety tab removed ejects if you try to record on it.

To record on a tape with its safety tab removed, cover the tab hole with adhesive tape.



Recording TV programmes using the timer


TIMER REC ON/OFF
MENU
CURSOR
EXECUTE
SONY

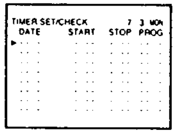
This section shows you how to let the VCR automatically start and stop recording TV programmes. You can preset up to eight programmes within a one month time frame.

Before you start...

- Check that the clock is set correctly.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.
- Turn on your TV and tune in to the VCR.

1 Press MENU and select TIMER SET/CHECK.

If the clock needs to be set, "PLEASE SET THE CLOCK" appears on the screen and the VCR automatically enters the clock setting mode.


TIMER SET/CHECK 7 3 MON
DATE START STOP PROG

Tips

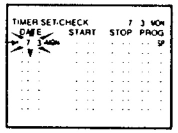
- To set the programme position, you can also use the PROG +/– or number buttons.
- To record video sources from LINE IN jacks, press INPUT SELECT to display "LINE" in the "PROG" position.
- To record NTSC signals, set the tape speed to SP or EP.

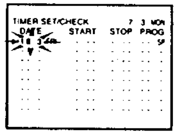
2 Set the date to start recording:

1 Press CURSOR →.
Make sure today's date is flashing. If it isn't, reset the clock to the correct time.

2 Press CURSOR ↑ to set the date and month.
The day of the week is set automatically.

To record the same programme every day or the same day once a week, see "Daily/weekly recording" on page **22**.


TIMER SET/CHECK 7 3 MON
DATE START STOP PROG


TIMER SET/CHECK 7 3 MON
DATE START STOP PROG

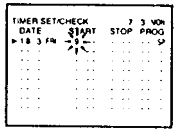
Tip

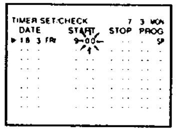
- To set the recording tape speed, you can also use TAPE SPEED.

3 Set the time to start recording.

1 Press CURSOR → to flash the hours under "START", then press the CURSOR (↑/↓) buttons to set the hours.

2 Press CURSOR → to flash the minutes under "START", then press the CURSOR (↑/↓) buttons to set the minutes.

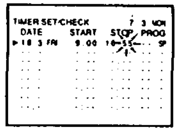

TIMER SET/CHECK 7 3 MON
DATE START STOP PROG


TIMER SET/CHECK 7 3 MON
DATE START STOP PROG

Tip

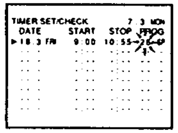
- To change or correct a setting before confirming it, press CURSOR ← to flash the item you want to change and reset it.

4 Press CURSOR →, then set the time to stop recording in the same way.


TIMER SET/CHECK 7 3 MON
DATE START STOP PROG

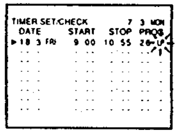
5 Press CURSOR →, then press the CURSOR (↑/↓) buttons to select the programme position you want to record.

Only the programme positions preset in the VCR will appear.


TIMER SET/CHECK 7 3 MON
DATE START STOP PROG

6 Press CURSOR →, then press the CURSOR (↑/↓) buttons to select the tape speed, SP (standard play) or LP (long play).

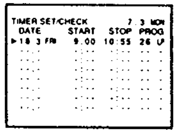
See "To select tape speeds" on page **18**.


TIMER SET/CHECK 7 3 MON
DATE START STOP PROG

7 To confirm your programme, press CURSOR →.

All the setting stop flashing and the cursor (▶) appears in the leftmost column.

To preset another timer setting, move the cursor to the next line using CURSOR ↓ and repeat steps **2** to **7**.


TIMER SET/CHECK 7 3 MON
DATE START STOP PROG
▶18 3 FRI 9:00 10:55 26 LP

8 After making the desired timer settings, press EXECUTE, then press TIMER REC ON/OFF.

The TIMER REC indicator on the VCR lights up and the VCR turns off and stands by for recording.

The VCR automatically turns on and starts recording at the preset start time, and turns off at the preset stop time.

To stop recording

To stop while the VCR is recording a programme, press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR.

To use the VCR while recording

You can do the following tasks during timer recording.

To	Press
Reset the counter to "0H00M00S"	COUNTER RESET
Display tape information on the TV screen	DISPLAY
Check the timer settings	MENU and select TIMER SET/CHECK
Watch another TV programme	See "Watching a TV programme while recording another" on page **19**.

Using the VCR before timer recording begins

Press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR, then press POWER. The VCR is ready for use.

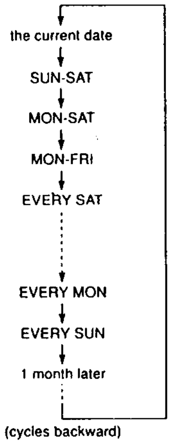
After using the VCR, press TIMER REC ON/OFF again to turn on the TIMER REC indicator on the VCR.
Remember to reset the VCR to stand by for recording before the time you've set the VCR to start recording, or the timer setting will be cancelled.

Daily/weekly recording

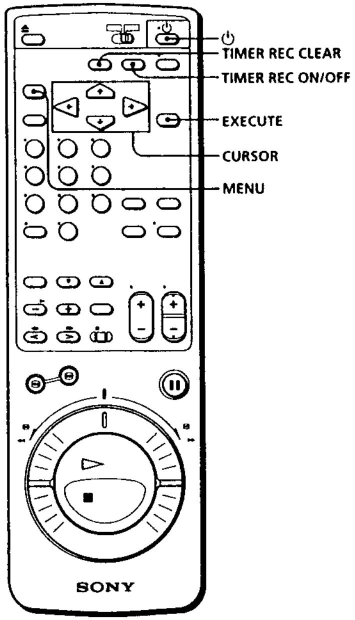
Daily recording records the same programme every day of the week; weekly recording records the same programme on the same day, every week.

When you set the date to start recording in step **2** of "Recording TV programmes using the timer, "press CURSOR ↓ until the desired day appears. Each time you press the button, the indication changes as shown on the left.

Daily/weekly recording



Checking/changing/ cancelling timer settings



This section shows you how to check, change and cancel the timer settings after you've stored them in the VCR.

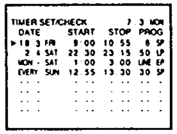
Before you start...

- Turn on your TV and tune in to the VCR.

1 **Press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR.**

2 **Press ⏻ (on/standby) to turn on the VCR.**

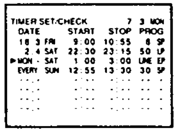
3 **Press MENU and select TIMER SET/ CHECK.**



```
TIMER SET/CHECK            7 3 MON
  DATE        START  STOP   PROG
▶18  3 FRI     9:00  10:55    6 SP
  2  4 SAT    22:30  23:15   50 LP
 MON - SAT     1:00   3:00 LINE EP
 EVERY SUN    12:55  13:30   30 SP
  -- -        --:--  --:--  -- -
  -- -        --:--  --:--  -- -
  -- -        --:--  --:--  -- -
  -- -        --:--  --:--  -- -
```

4 **Check the timer settings:**

- If you do not want to change or cancel the settings, press EXECUTE, then TIMER REC ON/OFF to return to recording standby.
- If you want to change or cancel the settings, press the CURSOR (↑/↓) buttons to move the cursor (▶) to the setting you want to change or cancel.



```
TIMER SET/CHECK            7 3 MON
  DATE        START  STOP   PROG
 18  3 FRI     9:00  10:55    6 SP
  2  4 SAT    22:30  23:15   50 LP
▶MON - SAT     1:00   3:00 LINE EP
 EVERY SUN    12:55  13:30   30 SP
  -- -        --:--  --:--  -- -
  -- -        --:--  --:--  -- -
  -- -        --:--  --:--  -- -
  -- -        --:--  --:--  -- -
```

5 **Change or cancel the timer setting:**

- To change the setting, press the CURSOR (←/→) buttons to flash the item you want to change, and reset it using the CURSOR (↑/↓) buttons. Then, press CURSOR → to move the cursor to the leftmost column.
- To cancel the setting, press TIMER REC CLEAR.

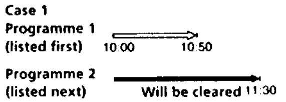
6 **Press EXECUTE.**

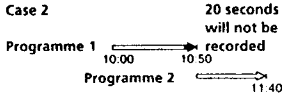
The VCR returns to the original screen. When there are any other timer settings left in the TIMER SET/CHECK menu, press TIMER REC ON/OFF to return to recording standby.

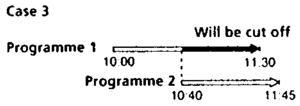
To check the timer settings during timer recording

Press MENU and select TIMER SET/CHECK. After checking, press EXECUTE to turn off the display.

Checking/changing/cancelling timer settings (continued)







When the timer settings overlap

The VCR will not record overlapping programmes. If any of your timer settings overlap, change the settings.

Case 1: If you preset two programmes to start recording at the same time...

The programme listed first in the TIMER SET/CHECK menu has priority over the other programmes. The timer settings of lower priority programmes will be erased from the TIMER SET/CHECK menu when the first programme begins recording.

Case 2: If you preset programme 2 to start recording at the same time you preset programme 1 to finish recording...

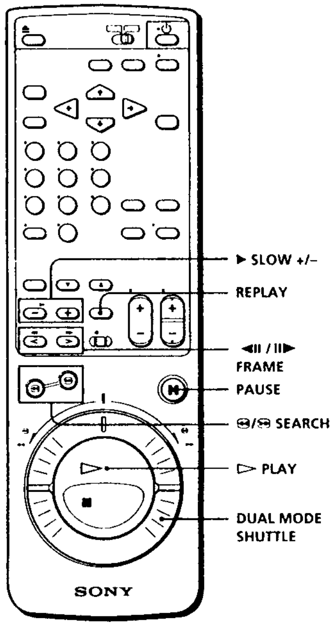
The last 20 seconds of programme 1 will not be recorded because the VCR will enter recording pause for programme 2 before programme 1 is finished.

Case 3: If you preset programme 2 to start recording before programme 1 is finished recording...

Programme 2 will start recording before programme 1 has finished.

Additional Operations

Playing/searching at various speeds



Tip

- Adjust the picture using the ▼/▲ TRACKING NORMAL/SLOW STILL ADJUST buttons if:
  - Streaks appear while playing in slow motion.
  - Bands appear on the top or bottom while pausing.
  - The picture shakes while pausing.

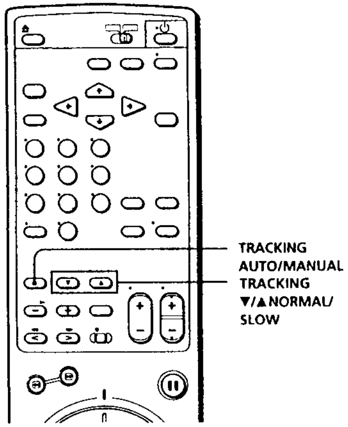
Note

- If you use these functions in the LP mode, noise may appear or there may be no colour.

You can play back a tape at various speeds: high-speed, slow motion, frame by frame and so on. These options are also useful for searching for a specific point during playback. The sound is muted during these operations.

Playback options	Operation	To resume normal playback
Playing at various speeds:	During playback or pause, turn the DUAL MODE SHUTTLE ring right or left to:	Release the ring.
One-fifth the normal speed	1/5	
Twice the normal speed	×2	
High speed	⏩ or ⏪	
Fast-forwarding/ Rewinding	During stop, turn the DUAL MODE SHUTTLE ring to ▶▶ FF or to ◀◀ REW and release.	Press ▷ PLAY.
Viewing the picture during fast-forward or rewind	During fast-forward, turn the DUAL MODE SHUTTLE ring to ⏩. During rewind, turn the ring to ⏪.	To return to the previous mode, release the ring.
Locking in a high-speed picture	During playback or pause, press ⏩ SEARCH or ⏪ SEARCH. To change direction, press ◀II FRAME (backward) or II▶ FRAME (forward).	Press ▷ PLAY.
Locking in a slow-motion picture	During playback or pause, press I▶ SLOW +/–. You can increase the playback speed with the + button and decrease the speed with the – button. To change direction, press ◀II FRAME (backward) or II▶ FRAME (forward).	Press ▷ PLAY.
Playing frame by frame	During pause, press II▶ FRAME to advance the picture one frame or ◀II FRAME to reverse the picture one frame.	Press ▷ PLAY.
Playing in reverse	During playback, press ◀II FRAME.	Press ▷ PLAY.
Replaying a scene	During playback or pause, press REPLAY and hold it down until the desired scene appears. When you release the button, the scene is played back in slow motion.	Press ▷ PLAY or II PAUSE.
Rewind and restart play	During stop, press ▷ PLAY on the VCR while holding the DUAL MODE SHUTTLE ring on the VCR at the ◀◀ position.	—

Adjusting the picture

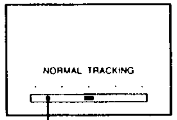


The VCR automatically adjusts the picture for the best possible playback or recording. If, however, you find the automatic adjustment unsatisfactory, you can adjust the picture manually.

Adjusting the tracking

Though the VCR automatically adjusts the tracking when playing a tape (the AUTO TRACKING indicator flashes in the display window, then lights steadily), distortion may occur if the tape was recorded in poor condition. If so, manually adjust the tracking condition.

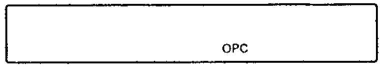
Press the ▼/▲ TRACKING NORMAL/SLOW buttons to display the tracking meter. The distortion should disappear as you press one of the two buttons. If you cannot get a clear picture with manual adjustment, press TRACKING AUTO/MANUAL to return to automatic adjustment.



Tracking meter

About Optimum Picture Control (OPC) *(SLV-436EE)*

Optimum Picture Control (OPC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you leave OPC on (with the OPC indicator lit in the VCR's display window).



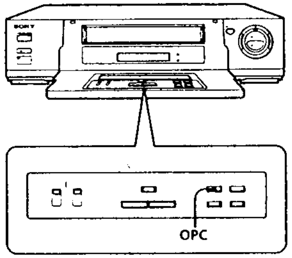
To use OPC during playback

The OPC function automatically works on all types of tapes, including rental tapes. You can play a tape using the OPC function even if the tape was not recorded with it.

To use OPC while recording

Whenever you insert a tape and first start recording, the VCR adjusts to the tape using the OPC function (the OPC indicator flashes rapidly). This adjustment is retained until the tape is ejected. There is a short delay before the VCR actually starts recording while the VCR analyses the tape.

If you want to start recording precisely the first time you record, set the VCR to recording pause mode (the OPC indicator flashes slowly) and press ● REC to let the VCR analyse the tape. When the OPC indicator stops flashing, press ❚❚ PAUSE to start recording.
Recording begins immediately.

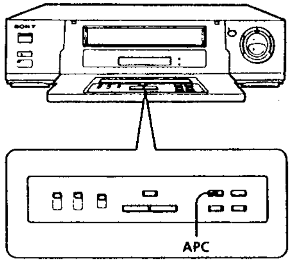


Tip

- We recommend you leave OPC on even when recording on a tape played back on a VCR without the OPC function.

Notes

- Tapes recorded using the OPC function are played back normally on VCRs that do not have the OPC function.
- Press ❚❚ PAUSE to release recording after the OPC indicator stops flashing. If you start recording before the OPC indicator stops flashing, the OPC function is cancelled.



Tip

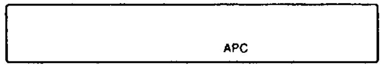
- We recommend you leave APC on even when recording on a tape played back on a VCR without the APC function.

Notes

- Tapes recorded using the APC function are played back normally on VCRs that do not have the APC function.
- Press ❚❚ PAUSE to release recording after the APC indicator stops flashing. If you start recording before the APC indicator stops flashing, the APC function is cancelled.

About Adaptive Picture Control (APC) *(SLV-X711ME/ X711PS/X711SG)*

Adaptive Picture Control (APC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you leave APC on (with the APC indicator in the VCR's display window lit).

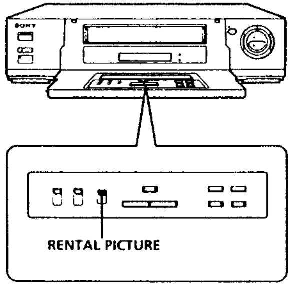


To use APC during playback

The APC function automatically works on all types of tapes, including rental tapes. You can play a tape using the APC function even if the tape was not recorded with it.

To use APC while recording

Whenever you insert a tape and first start recording, the VCR adjusts to the tape using the APC function (the APC indicator flashes rapidly). This adjustment is retained until the tape is ejected. There is a short delay before the VCR actually starts recording while the VCR analyses the tape.
If you want to start recording precisely the first time you record, set the VCR to recording pause mode (the APC indicator flashes slowly) and press ● REC to let the VCR analyse the tape. When the APC indicator stops flashing, press ❚❚ PAUSE to start recording.
Recording begins immediately.



Reducing streaks and/or snow *(SLV-X711ME/X711PS/ X711SG only)*

If you do not satisfy the picture quality while playing a tape, even if APC/OPC is on, set the RENTAL PICTURE switch on the VCR to ON according to your taste.

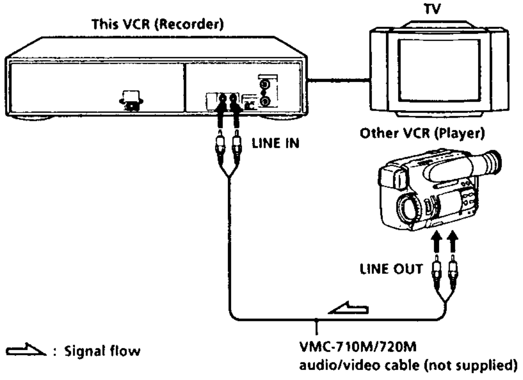
Editing with another VCR

This section shows you how to edit to or from another VCR or camcorder. You can make a copy of a tape using this VCR for recording or playback.

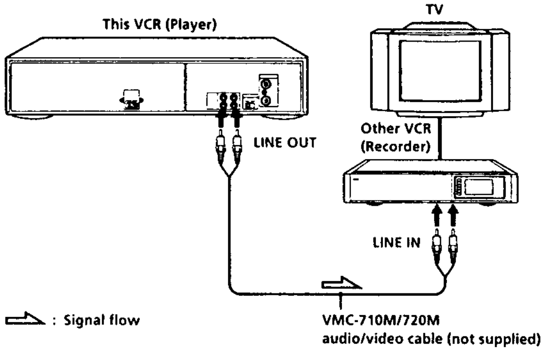
Tip

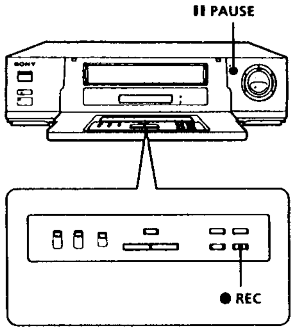
- Make sure you connect the plugs to jacks of the same colour.

How to hook up to record on this VCR


This VCR (Recorder)
TV
LINE IN
Other VCR (Player)
LINE OUT
⇨ : Signal flow
VMC-710M/720M
audio/video cable (not supplied)

How to hook up to record to another VCR


This VCR (Player)
TV
LINE OUT
Other VCR
(Recorder)
LINE IN
⇨ : Signal flow
VMC-710M/720M
audio/video cable (not supplied)



Tips

- To release the VCRs from pause, use the ❚❚ PAUSE buttons on the VCRs so that you can edit more precisely.
- To cut out unwanted scenes while editing, press ❚❚ PAUSE on this VCR when an unwanted scene begins. When it ends, press ❚❚ PAUSE again to resume recording (Assemble Editing).

Operation (when recording on this VCR)

Before you start editing

- Press INPUT SELECT to display "L" in the display window.
- Press TAPE SPEED to select the recording tape speed (SP or LP for the PAL system, and SP or EP for the NTSC system).

1 **Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.**

2 **Insert a tape into this (recording) VCR. Search for the point to start recording and press ❚❚ PAUSE.**

3 **Press the ● REC and ❚❚ PAUSE buttons simultaneously on this VCR and set it to recording pause.**

4 **To start editing, press the ❚❚ PAUSE buttons on both VCRs to release the VCRs from pause.**
For best results, press the pause button on the other VCR just before pressing ❚❚ PAUSE on this VCR.

To stop editing
Press the ■ STOP buttons on both VCRs.

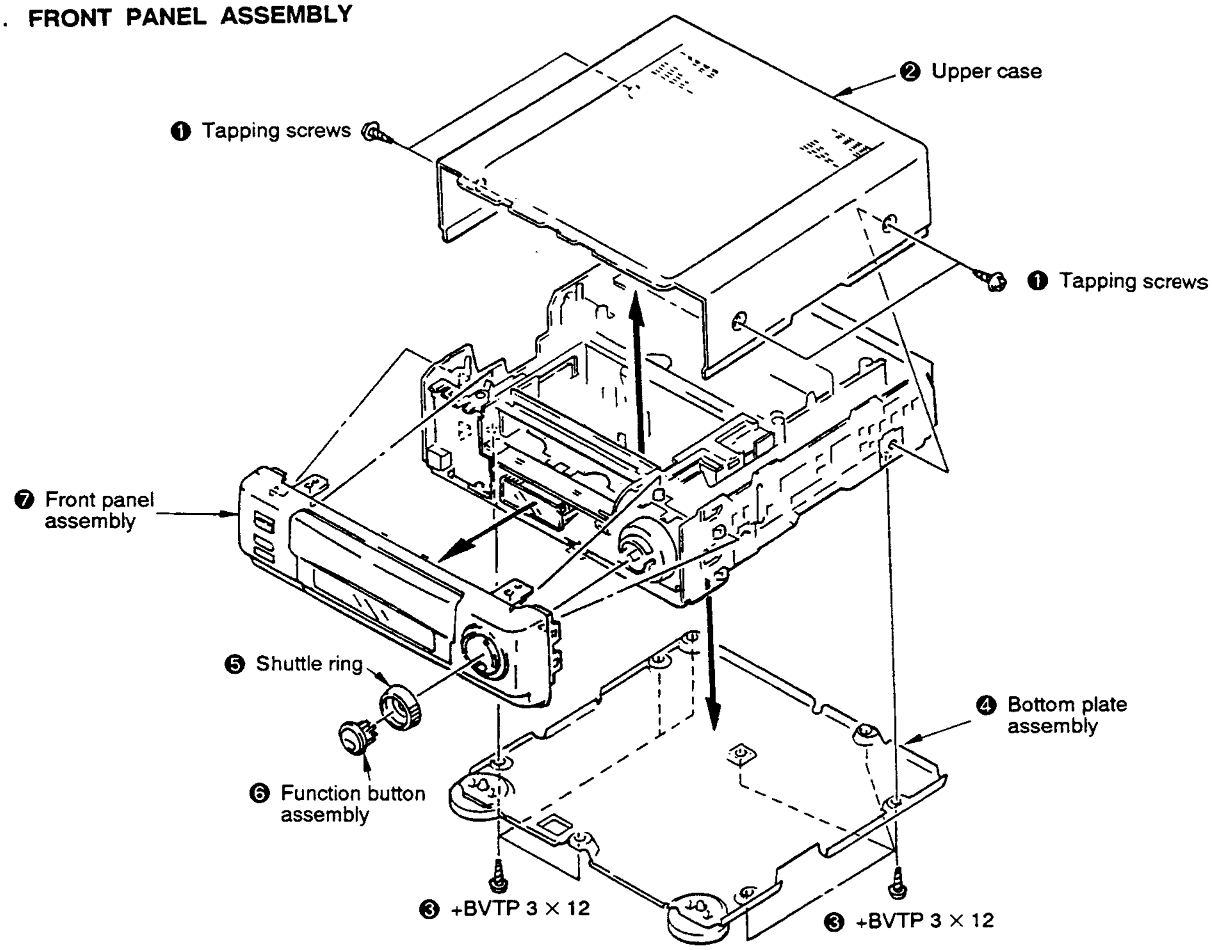
SECTION 2

DISASSEMBLY

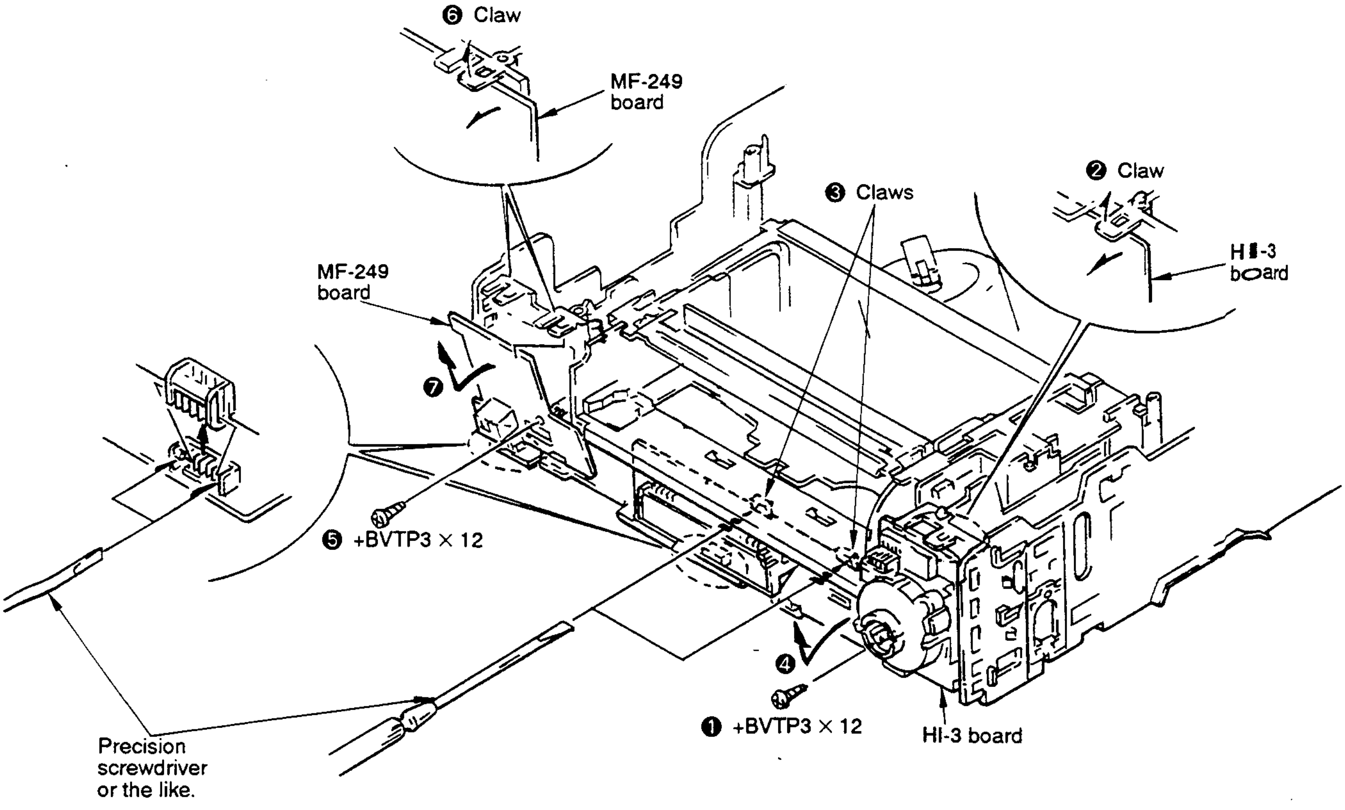
Note: Follow the disassembly procedure in the numerical order given.

2-1. SLV-286EE/X311

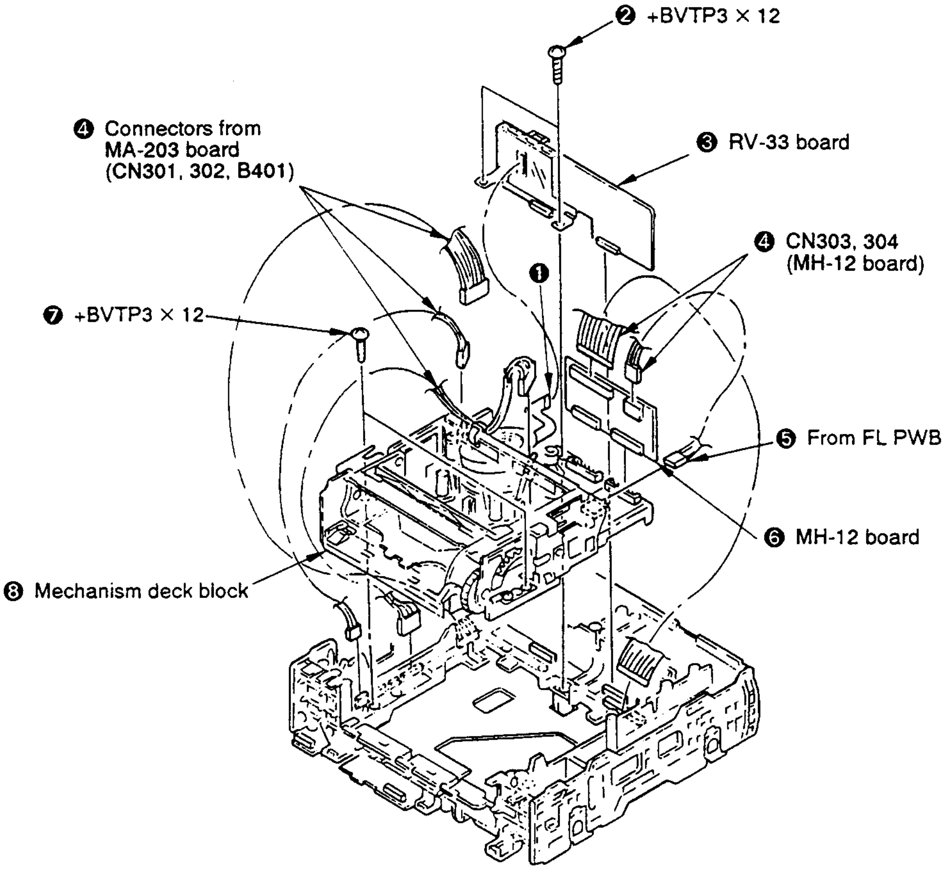
2-1-1. FRONT PANEL ASSEMBLY


❷ Upper case
❶ Tapping screws
❶ Tapping screws
❼ Front panel assembly
❺ Shuttle ring
❹ Bottom plate assembly
❻ Function button assembly
❸ +BVTP 3 × 12
❸ +BVTP 3 × 12

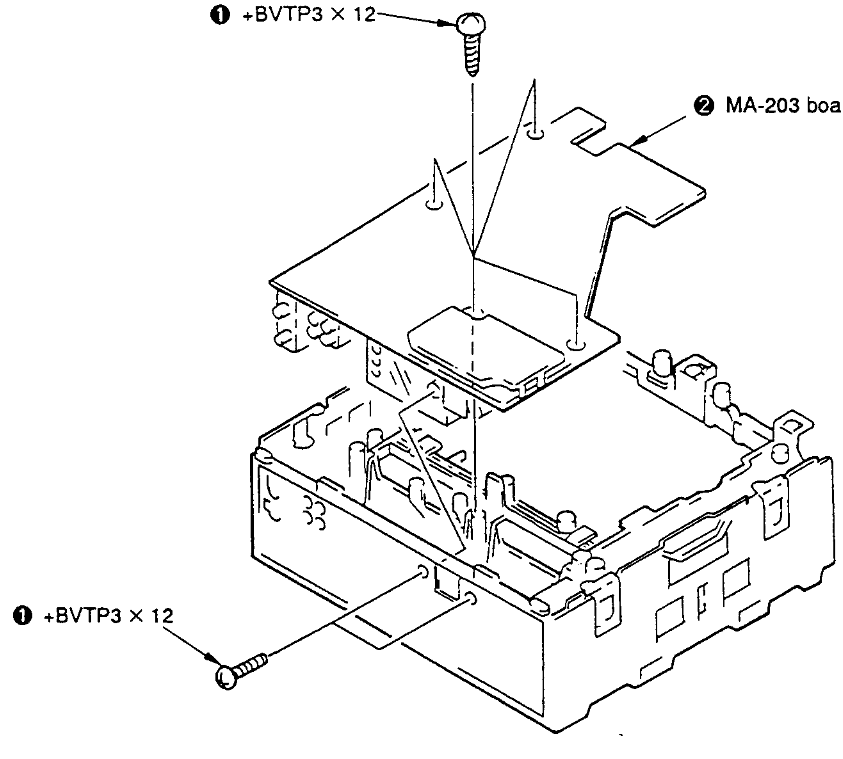
2-1-2. HI-3 AND MF-249 BOARDS


❻ Claw
MF-249 board
❸ Claws
❷ Claw
HI-3 board
MF-249 board
❼
❺ +BVTP3 × 12
❹
❶ +BVTP3 × 12
HI-3 board
Precision screwdriver or the like.

2-1-3. RV-33 BOARD AND MECHANISM DECK BLOCK

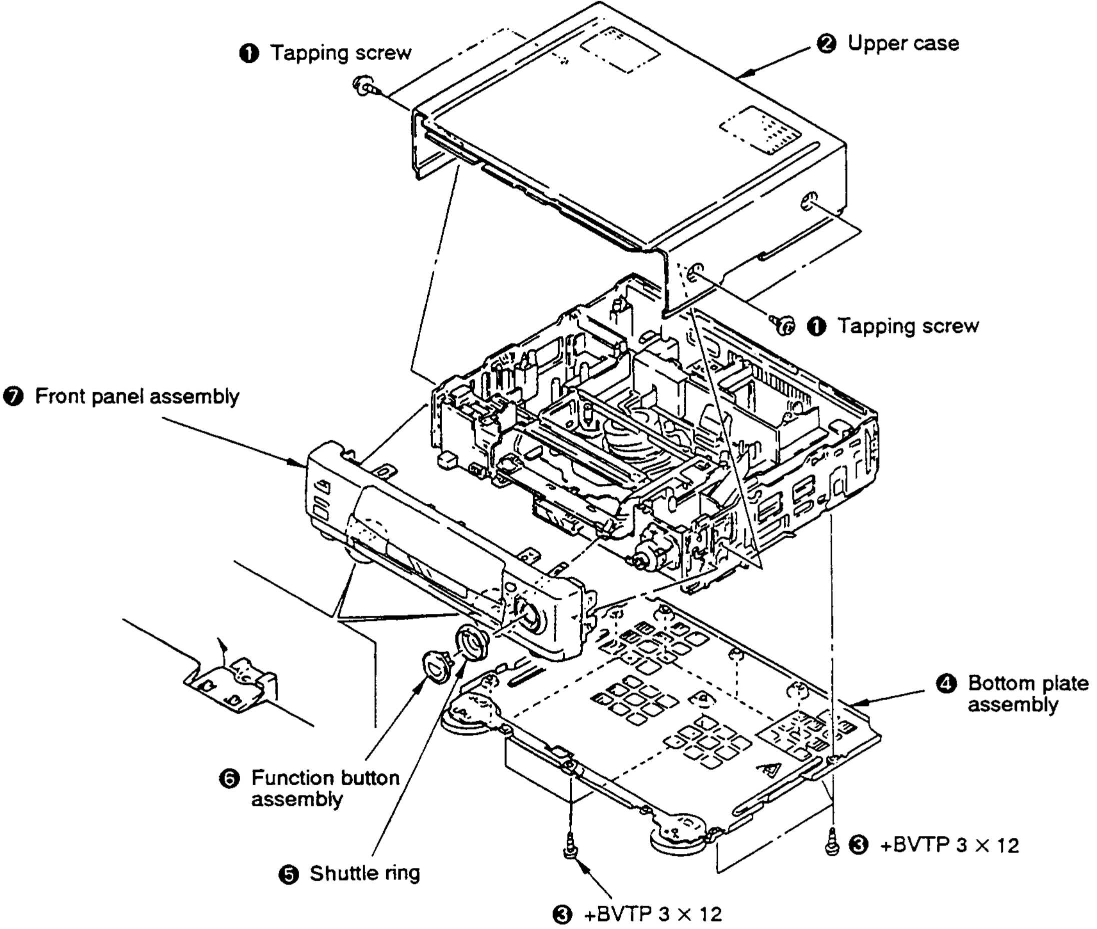

❷ +BVTP3 × 12
❹ Connectors from MA-203 board (CN301, 302, B401)
❸ RV-33 board
❹ CN303, 304 (MH-12 board)
❶
❼ +BVTP3 × 12
❺ From FL PWB
❻ MH-12 board
❽ Mechanism deck block

2-1-4. MA-203 BOARD

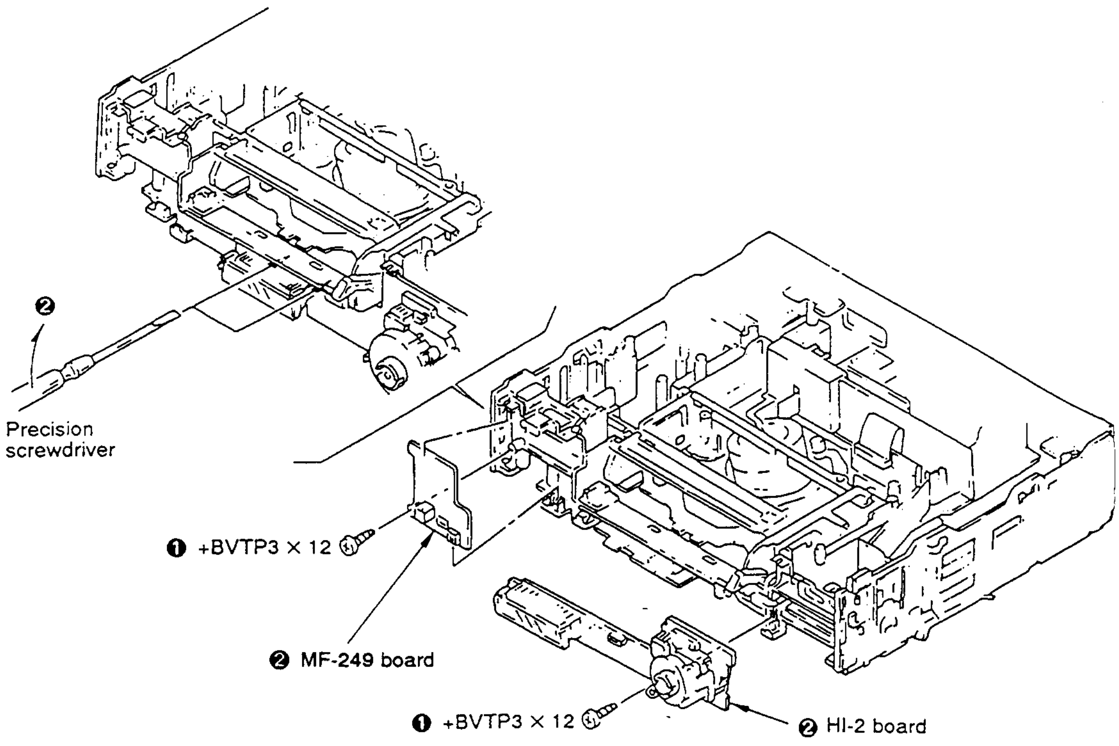

❶ +BVTP3 × 12
❷ MA-203 board
❶ +BVTP3 × 12

2-2. SLV-436EE/X711

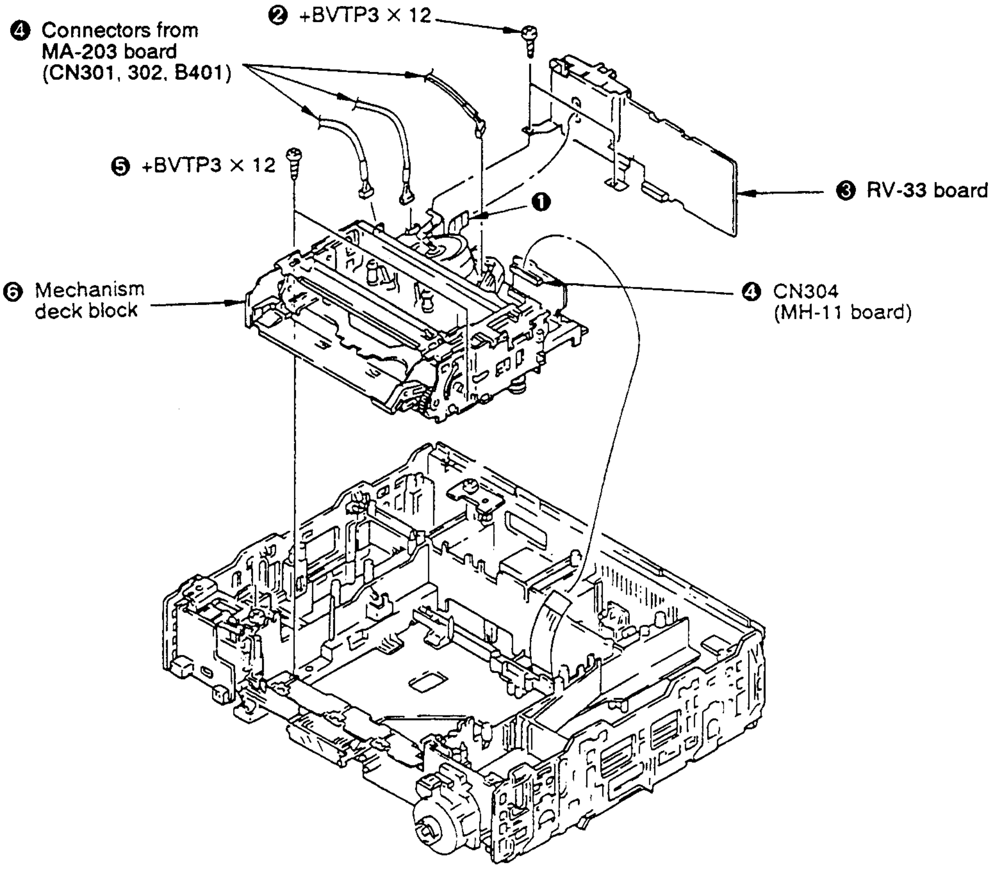
2-2-1. FRONT PANEL ASSEMBLY


❶ Tapping screw
❷ Upper case
❶ Tapping screw
❼ Front panel assembly
❹ Bottom plate assembly
❻ Function button assembly
❸ +BVTP 3 × 12
❺ Shuttle ring
❸ +BVTP 3 × 12

2-2-2. HI-2 AND MF-249 BOARDS

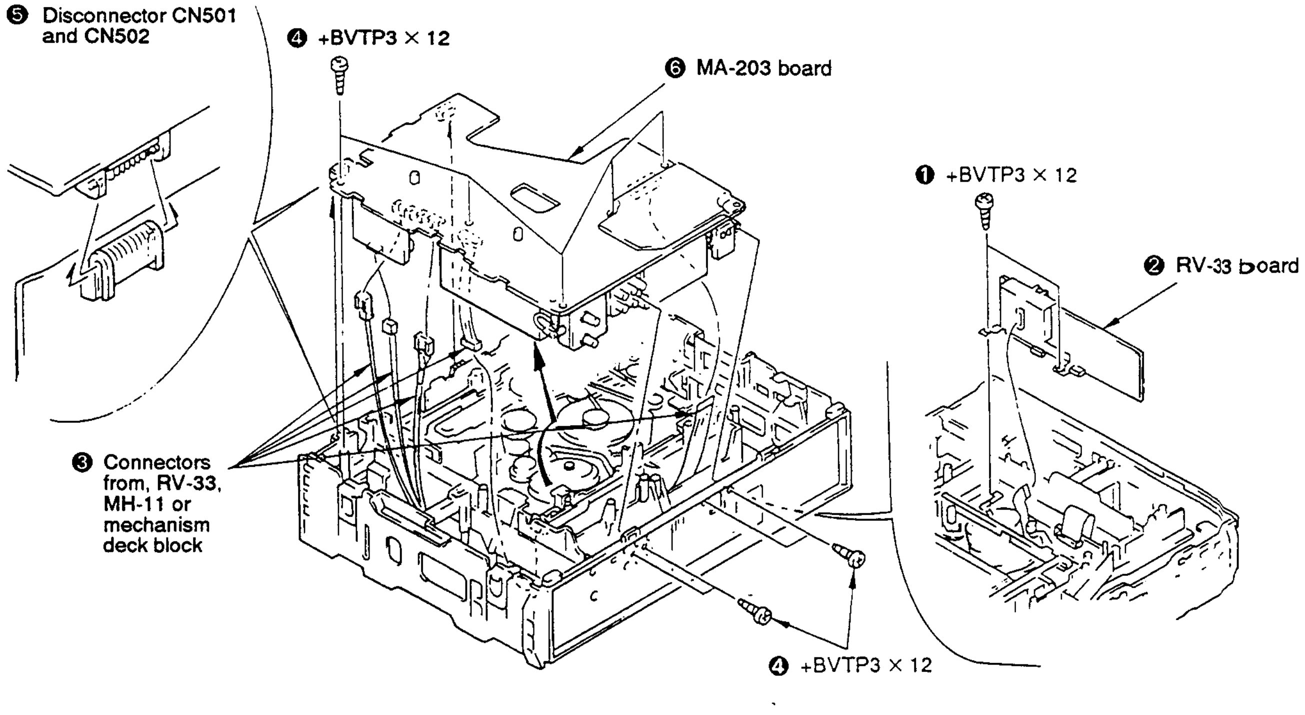

❷
Precision screwdriver
❶ +BVTP3 × 12
❷ MF-249 board
❶ +BVTP3 × 12
❷ HI-2 board

2-2-3. RV-33 BOARD AND MECHANISM DECK BLOCK



❷ +BVTP3 × 12
❹ Connectors from MA-203 board (CN301, 302, B401)
❺ +BVTP3 × 12
❶
❸ RV-33 board
❻ Mechanism deck block
❹ CN304 (MH-11 board)

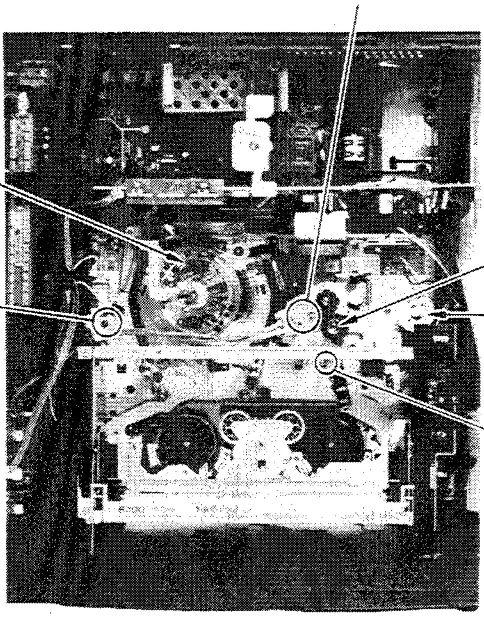
2-2-4. MA-203 BOARD



❺ Disconnector CN501 and CN502
❹ +BVTP3 × 12
❻ MA-203 board
❶ +BVTP3 × 12
❷ RV-33 board
❸ Connectors from, RV-33, MH-11 or mechanism deck block
❹ +BVTP3 × 12

2-3. INTERNAL VIEWS

– Top Side –



M901
Cylinder assembly (Drum)
SLV-286EE/X311: 3-949-186-01

SLV-436EE/X711: DZH-48A-R
8-848-597-11
Upper drum assembly
SLV-286EE/X311: 3-949-187-01

SLV-436EE/X711: DZR-21-R
8-848-540-01

FE base assembly
9-946-972-01

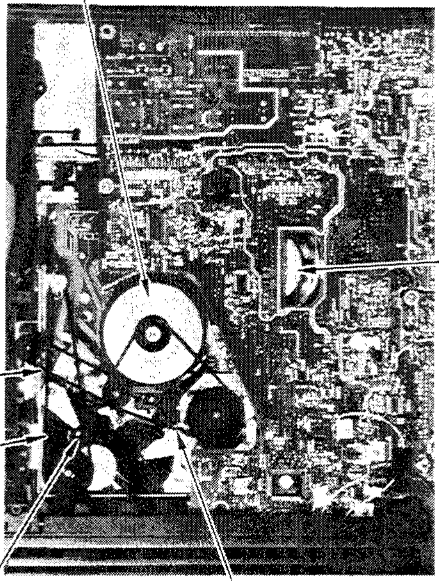
ACE head assembly
3-947-081-01

Pinch roller arm assembly
3-947-004-01

M903
Loading motor assembly
3-946-917-01

M902
Capstan motor
3-947-028-01

– Bottom Side –



M902
Capstan motory

M901
Drum assembly

FL belt
3-946-962-01

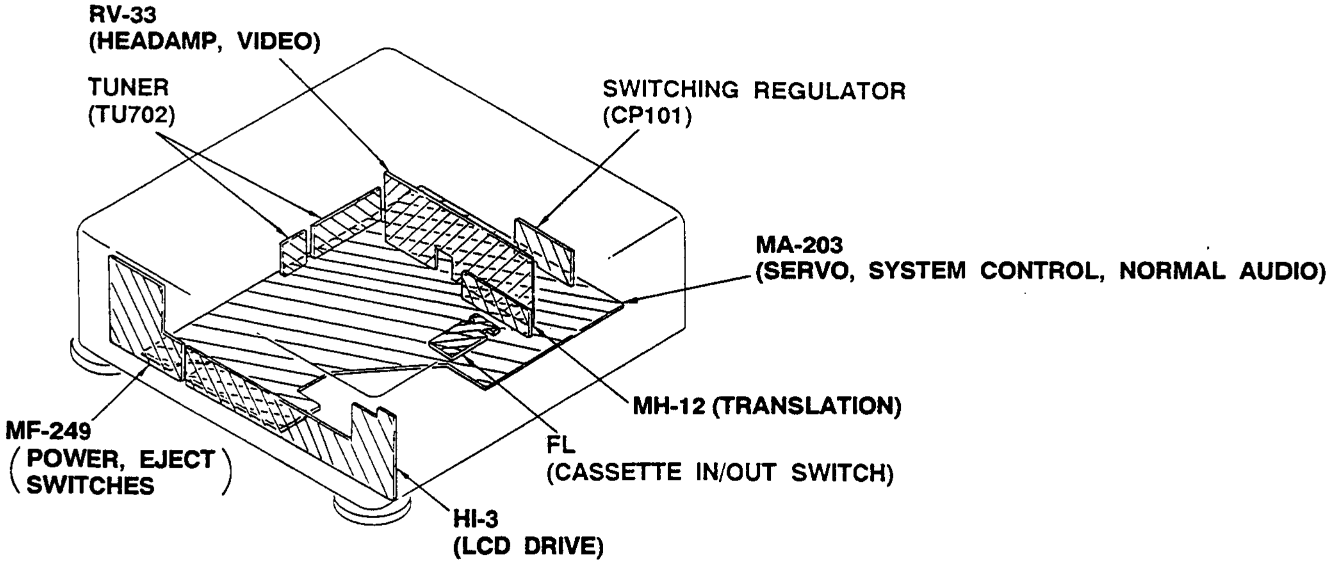
Loading belt
3-946-923-01

Mode switch
3-946-958-01

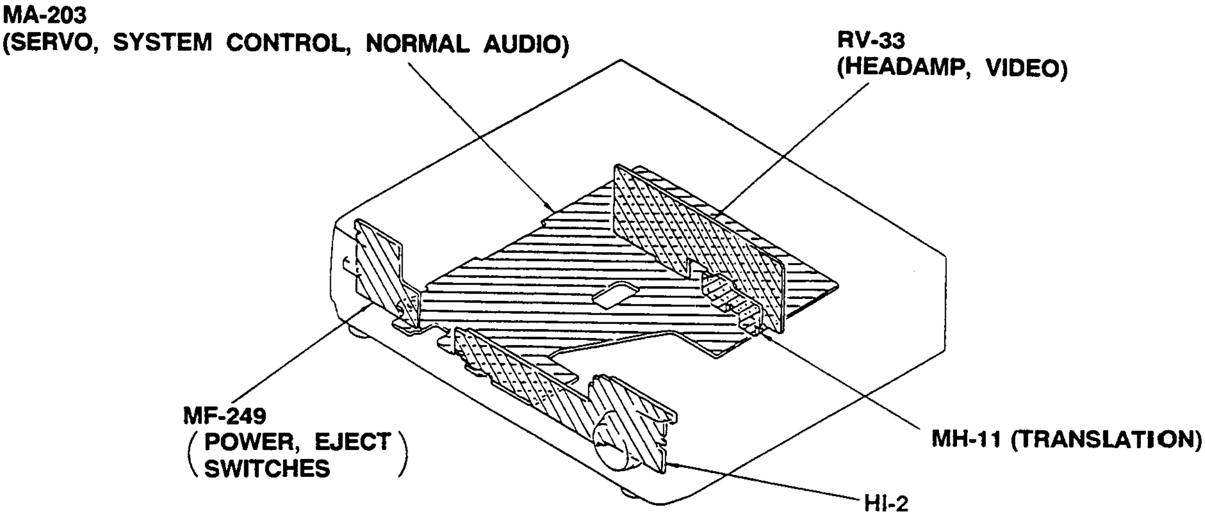
Drive belt
3-946-999-01

2-4. CIRCUIT BOARDS LOCATION

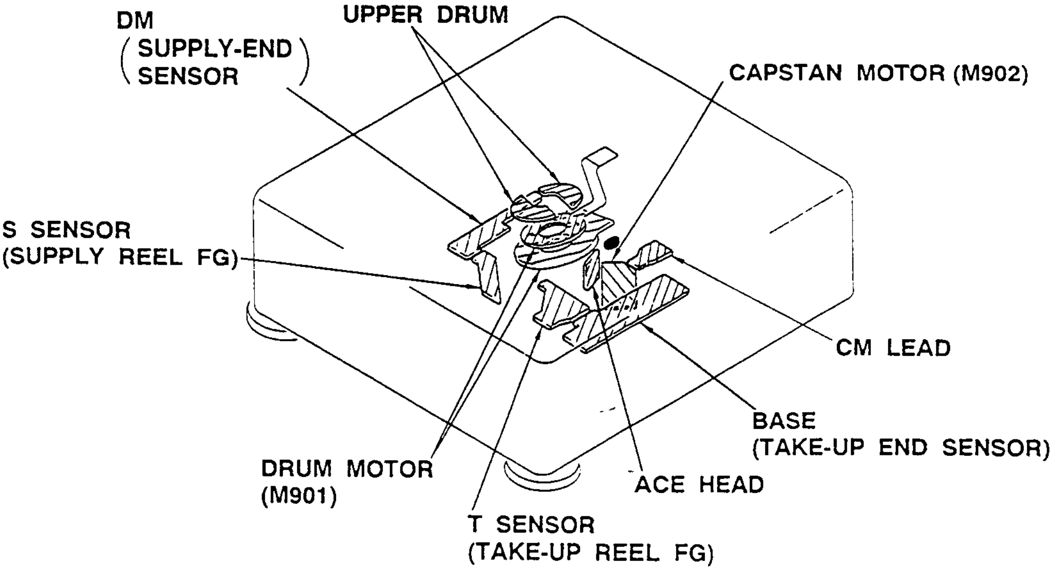
SLV-286EE/X311


RV-33
(HEADAMP, VIDEO)
TUNER
(TU702)
SWITCHING REGULATOR
(CP101)
MA-203
(SERVO, SYSTEM CONTROL, NORMAL AUDIO)
MH-12 (TRANSLATION)
FL
(CASSETTE IN/OUT SWITCH)
MF-249
(POWER, EJECT SWITCHES)
HI-3
(LCD DRIVE)

SLV-436EE/X711


MA-203
(SERVO, SYSTEM CONTROL, NORMAL AUDIO)
RV-33
(HEADAMP, VIDEO)
MF-249
(POWER, EJECT SWITCHES)
MH-11 (TRANSLATION)
HI-2
(LCD DRIVE)

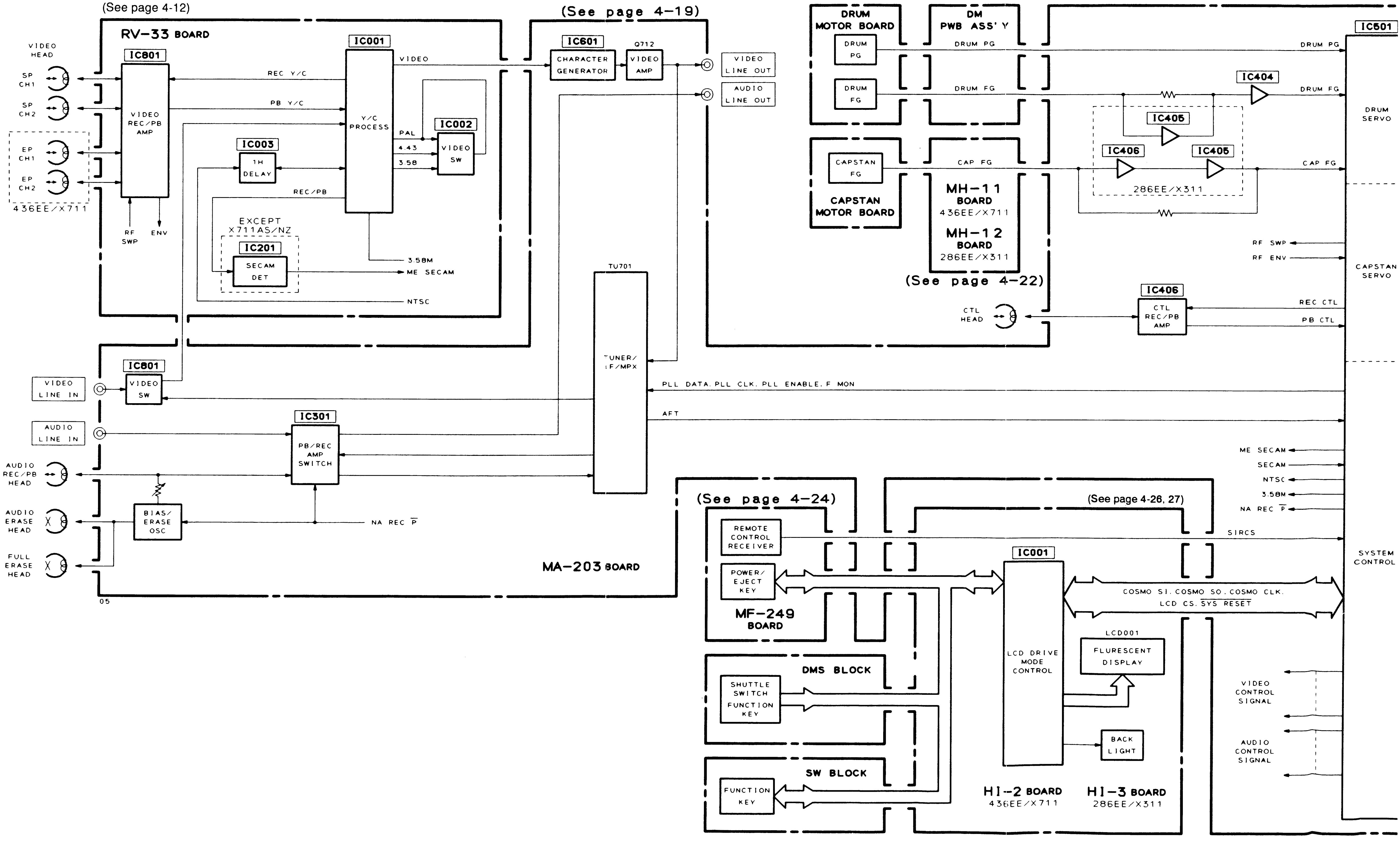
SLV-286EE/436EE/X311/X711
Illustration: 286EE/X311

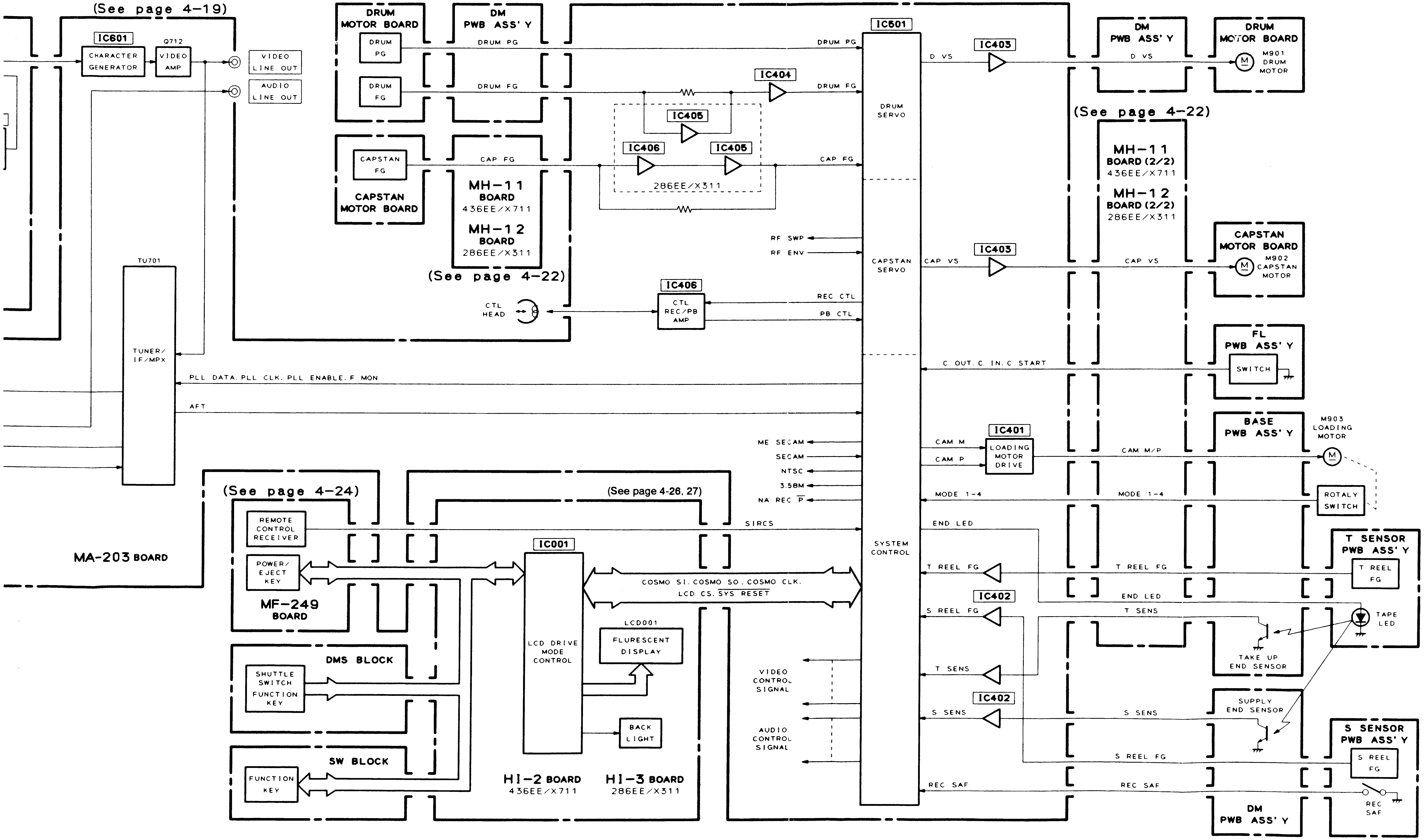

DM
(SUPPLY-END SENSOR)
UPPER DRUM
CAPSTAN MOTOR (M902)
S SENSOR
(SUPPLY REEL FG)
CM LEAD
BASE
(TAKE-UP END SENSOR)
DRUM MOTOR
(M901)
ACE HEAD
T SENSOR
(TAKE-UP REEL FG)

SECTION 3

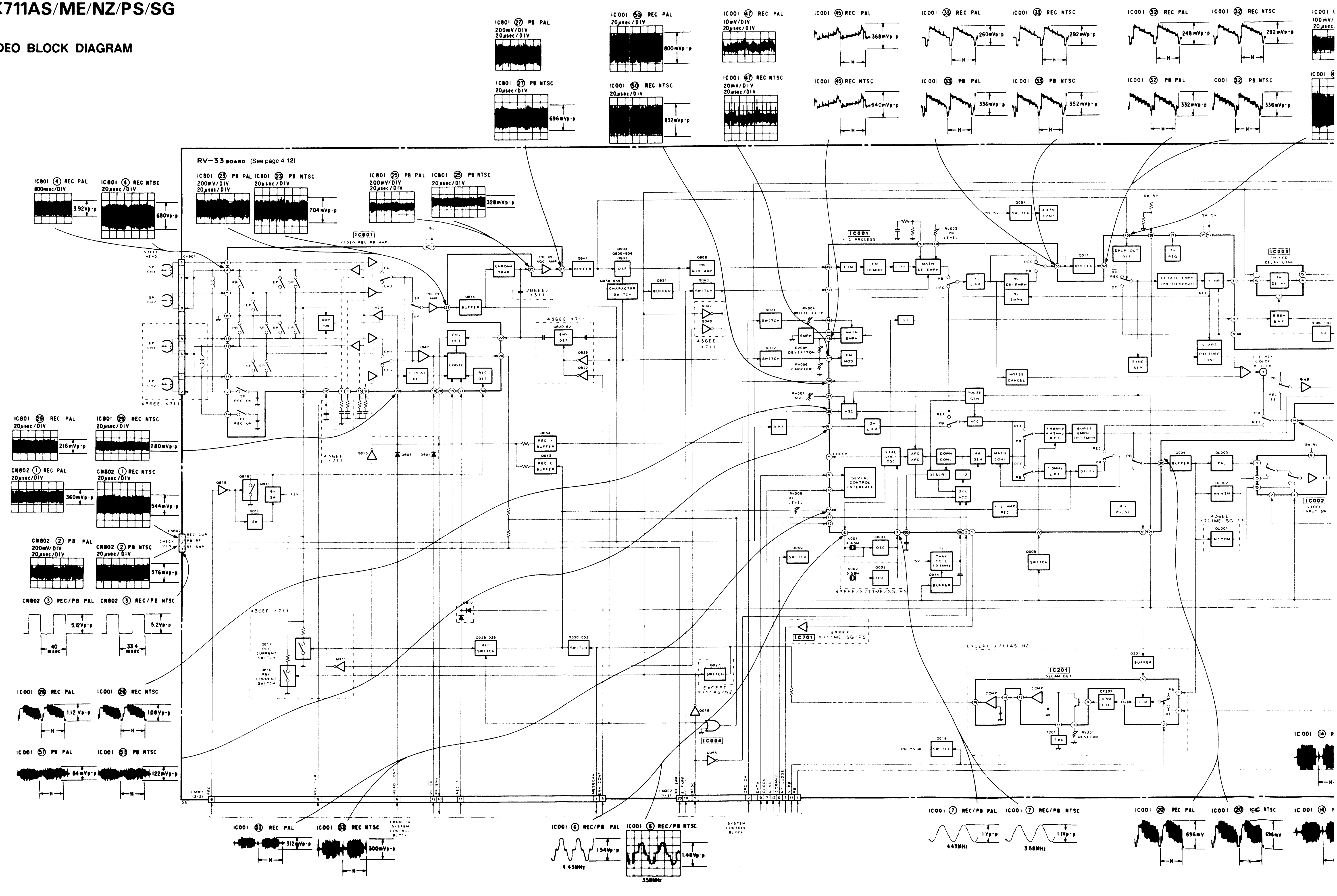
3-1. OVERALL BLOCK DIAGRAM

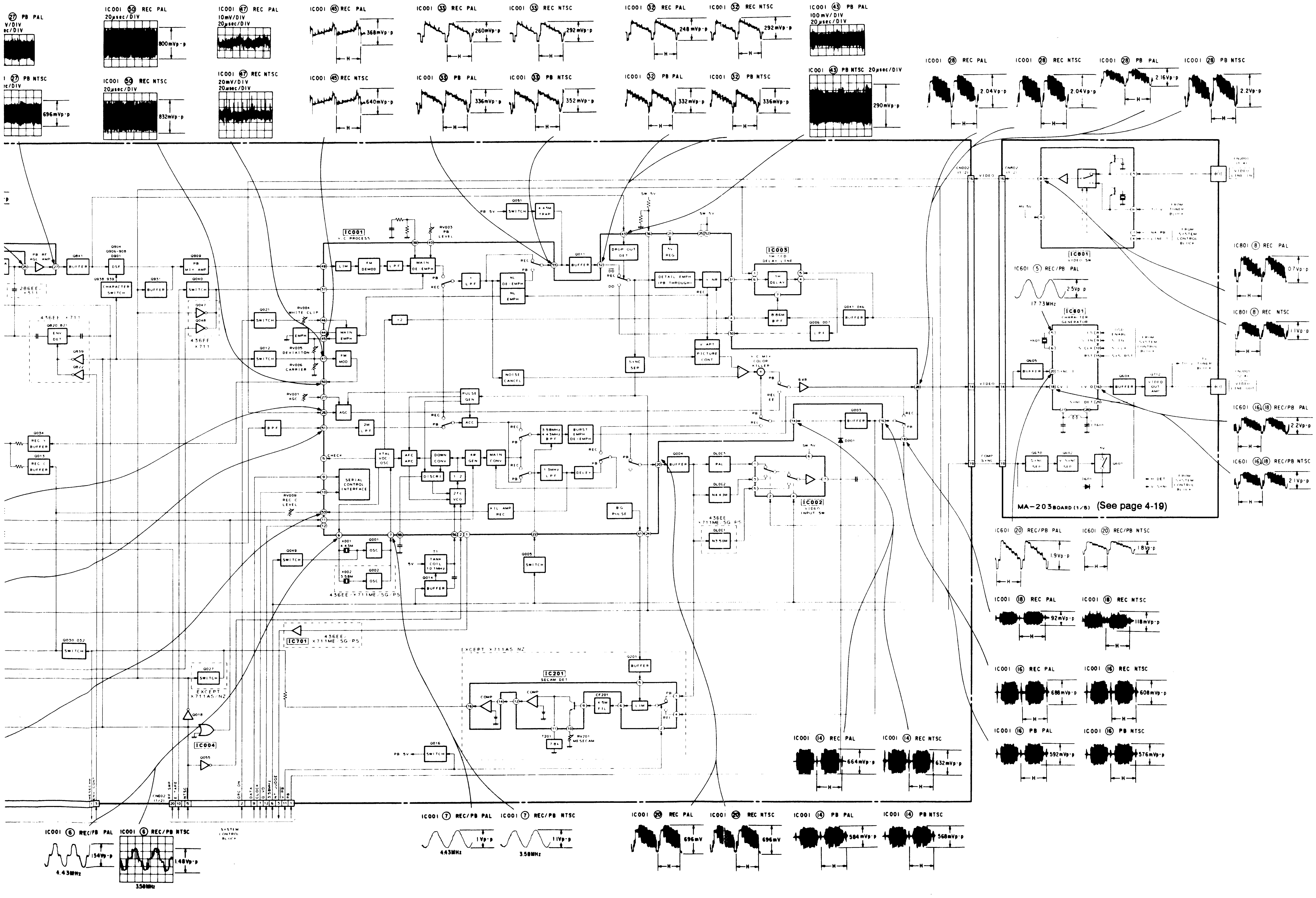
BLOCK DIAGRAMS


(See page 4-12)
RV-33 BOARD
VIDEO HEAD
SP CH1
SP CH2
EP CH1
EP CH2
436EE/X711
IC801
VIDEO REC/PB AMP
RF SWP
ENV
REC Y/C
PB Y/C
IC001
Y/C PROCESS
VIDEO
PAL
4.43
3.58
IC002
VIDEO SW
IC003
1H DELAY
REC/PB
EXCEPT X711AS/NZ
IC201
SECAM DET
3.58M
ME SECAM
NTSC
(See page 4-19)
IC601
CHARACTER GENERATOR
Q712
VIDEO AMP
VIDEO LINE OUT
AUDIO LINE OUT
TU701
TUNER/IF/MPX
PLL DATA. PLL CLK. PLL ENABLE. F MON
AFT
IC801
VIDEO SW
VIDEO LINE IN
AUDIO LINE IN
IC301
PB/REC AMP SWITCH
AUDIO REC/PB HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD
BIAS/ERASE OSC
NA REC P̄
MA-203 BOARD
05
DRUM MOTOR BOARD
DRUM PG
DRUM FG
DM PWB ASS'Y
DRUM PG
DRUM FG
CAPSTAN FG
CAPSTAN MOTOR BOARD
CAP FG
MH-11 BOARD
436EE/X711
MH-12 BOARD
286EE/X311
(See page 4-22)
CTL HEAD
IC501
DRUM PG
IC404
DRUM FG
IC405
IC406
IC405
286EE/X311
CAP FG
DRUM SERVO
RF SWP
RF ENV
CAPSTAN SERVO
IC406
CTL REC/PB AMP
REC CTL
PB CTL
ME SECAM
SECAM
NTSC
3.58M
NA REC P̄
SIRCS
SYSTEM CONTROL
(See page 4-24)
REMOTE CONTROL RECEIVER
POWER/EJECT KEY
MF-249 BOARD
DMS BLOCK
SHUTTLE SWITCH
FUNCTION KEY
SW BLOCK
FUNCTION KEY
(See page 4-26, 27)
IC001
LCD DRIVE MODE CONTROL
COSMO SI. COSMO SO. COSMO CLK.
LCD CS. SYS RESET
LCD001
FLURESCENT DISPLAY
BACK LIGHT
HI-2 BOARD
436EE/X711
HI-3 BOARD
286EE/X311
VIDEO CONTROL SIGNAL
AUDIO CONTROL SIGNAL

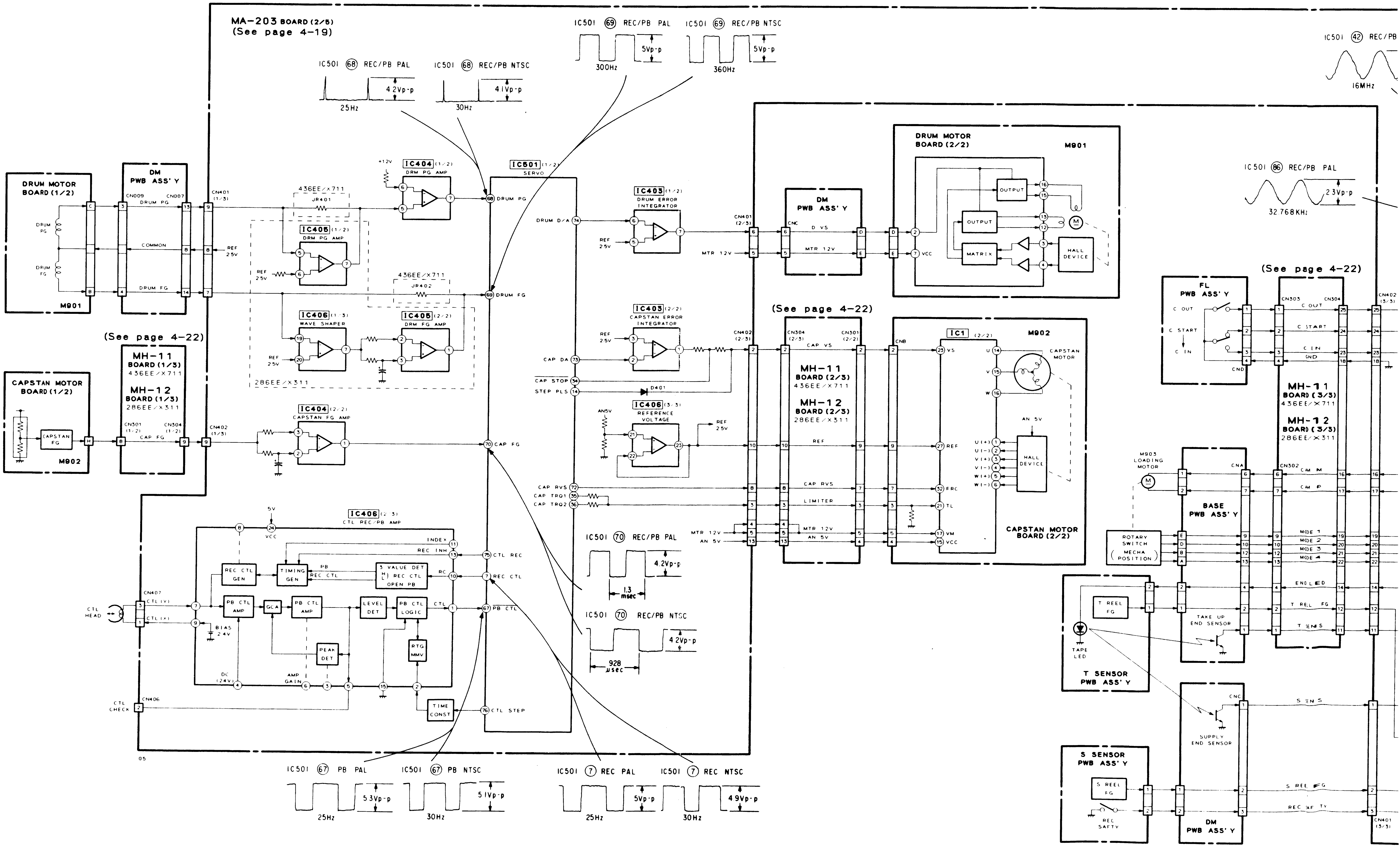

(See page 4-19)
IC601
CHARACTER GENERATOR
Q712
VIDEO AMP
VIDEO LINE OUT
AUDIO LINE OUT
DRUM MOTOR BOARD
DRUM PG
DRUM FG
DM PWB ASS' Y
DRUM PG
DRUM FG
CAPSTAN FG
CAPSTAN MOTOR BOARD
CAP FG
MH-11 BOARD
436EE/X711
MH-12 BOARD
286EE/X311
(See page 4-22)
IC404
IC405
IC406
IC405
286EE/X311
CTL HEAD
IC406
CTL REC/PB AMP
REC CTL
PB CTL
RF SWP
RF ENV
IC501
DRUM PG
DRUM FG
CAP FG
DRUM SERVO
CAPSTAN SERVO
SYSTEM CONTROL
TU701
TUNER/ IF/MPX
PLL DATA. PLL CLK. PLL ENABLE. F MON
AFT
ME SECAM
SECAM
NTSC
3.58M
NA REC P
SIRCS
VIDEO CONTROL SIGNAL
AUDIO CONTROL SIGNAL
MA-203 BOARD
(See page 4-24)
REMOTE CONTROL RECEIVER
POWER/ EJECT KEY
MF-249 BOARD
DMS BLOCK
SHUTTLE SWITCH FUNCTION KEY
SW BLOCK
FUNCTION KEY
(See page 4-26, 27)
IC001
LCD DRIVE MODE CONTROL
COSMO SI. COSMO SO. COSMO CLK.
LCD CS. SYS RESET
LCD001
FLURESCENT DISPLAY
BACK LIGHT
HI-2 BOARD
436EE/X711
HI-3 BOARD
286EE/X311
IC403
D VS
DM PWB ASS' Y
D VS
DRUM MOTOR BOARD
M901 DRUM MOTOR
(See page 4-22)
MH-11 BOARD (2/2)
436EE/X711
MH-12 BOARD (2/2)
286EE/X311
IC403
CAP VS
CAP VS
CAPSTAN MOTOR BOARD
M902 CAPSTAN MOTOR
FL PWB ASS' Y
SWITCH
C OUT. C IN. C START
IC401
CAM M
CAM P
LOADING MOTOR DRIVE
CAM M/P
BASE PWB ASS' Y
M903 LOADING MOTOR
MODE 1-4
MODE 1-4
ROTALY SWITCH
END LED
T REEL FG
T REEL FG
T SENSOR PWB ASS' Y
T REEL FG
IC402
END LED
S REEL FG
T SENS
TAPE LED
TAKE UP END SENSOR
T SENS
IC402
S SENS
S SENS
SUPPLY END SENSOR
S REEL FG
S SENSOR PWB ASS' Y
S REEL FG
REC SAF
REC SAF
REC SAF
DM PWB ASS' Y

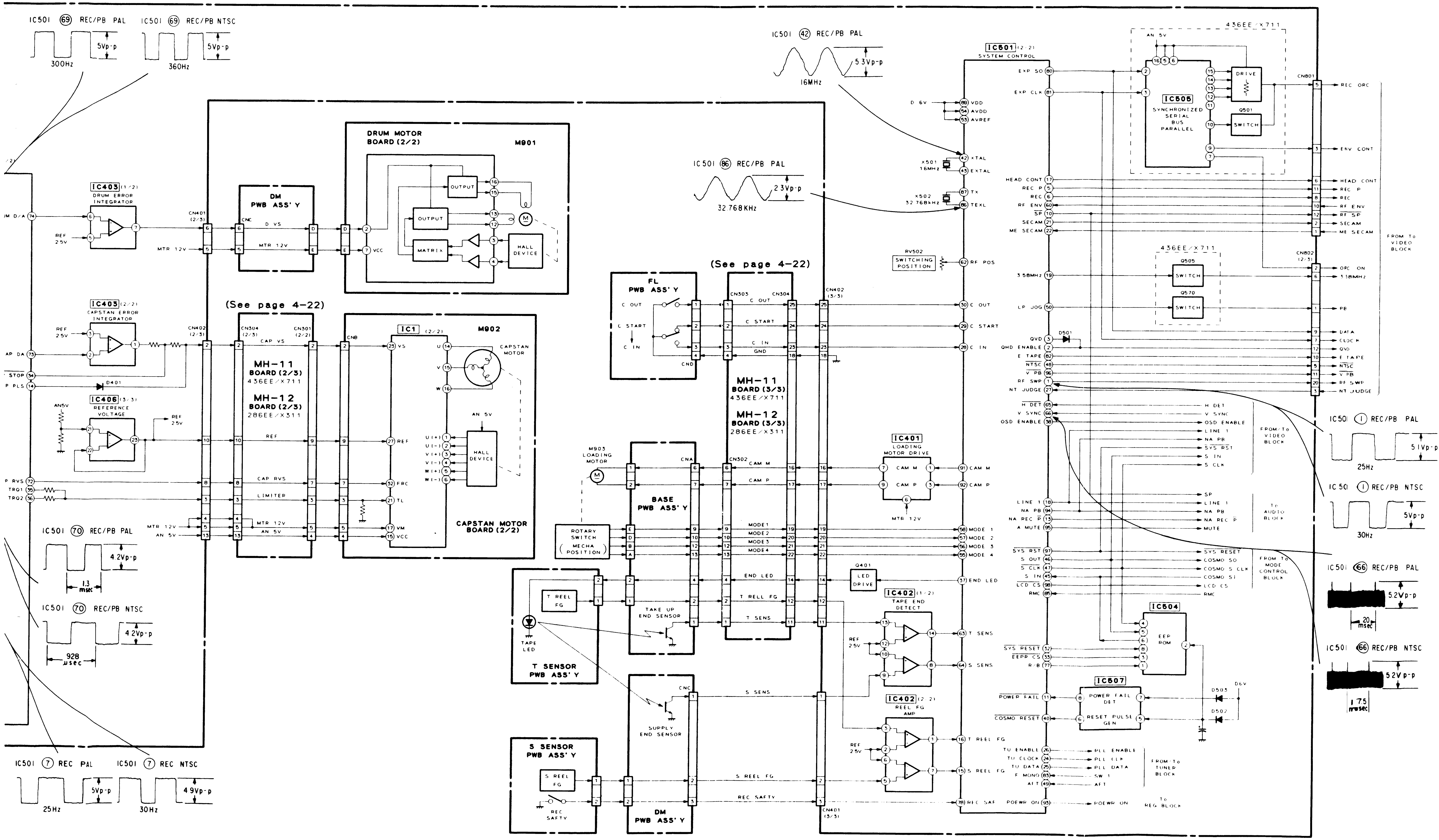
3-2. VIDEO BLOCK DIAGRAM


RV-33 BOARD (See page 4-12)
IC801 VIDEO REC PB AMP
IC001 Y C PROCESS
IC003 1H CCD DELAY LINE
IC002 VIDEO INPUT SW
IC201 SECAM DET
IC004
IC701 X711ME SG PS
VIDEO HEAD
SP CH1
SP CH2
EP CH1
EP CH2
CN801
CN802
CN001 (2/2)
CN002 (1/2)
CHECK PIN
REC CUR
PB RF
RF SWP
CHROMA TRAP
PB RF AGC AMP
BUFFER
DSP
CHARACTER SWITCH
PB MIX AMP
SWITCH
ENV DET
LOGIC
REC DET
T PLAY DET
COMP
REC Y BUFFER
REC C BUFFER
LIM
FM DEMOD
LPF
MAIN DE-EMPH
NL DE-EMPH
NL EMPH
MAIN EMPH
EMPH
FM MOD
AGC
2M LPF
BPF
SERIAL CONTROL INTERFACE
XTAL VXO OSC
AFC APC
DOWN CONV
DISCRI
1/2
2fc VCO
MAIN CONV
4fl GEN
ACC
PULSE GEN
NOISE CANCEL
SYNC SEP
DROP OUT DET
5V REG
DETAIL EMPH (PB THROUGH)
Y NR
1H DELAY
8.86M BPF
Y APT PICTURE CONT
C MIX COLOR KILLER
BURST EMPH DE-EMPH
1.5MHz LPF
DELAY
BG PULSE
PAL
NA 4.3M
N3.58M
TANK COIL
OSC
4.43M TRAP
RV001 AGC
RV003 PB LEVEL
RV004 WHITE CLIP
RV005 DEVIATION
RV006 CARRIER
RV009 REC C LEVEL
RV201 ME SECAM
CF201 4.5M FIL
SYSTEM CONTROL BLOCK
FROM/TO SYSTEM CONTROL BLOCK
IC801 ④ REC PAL 800nsec/DIV 3.92Vp-p
IC801 ④ REC NTSC 20μsec/DIV 680Vp-p
IC801 ㉓ PB PAL 200mV/DIV 20μsec/DIV
IC801 ㉓ PB NTSC 20μsec/DIV 704mVp-p
IC801 ㉕ PB PAL 200mV/DIV 20μsec/DIV
IC801 ㉕ PB NTSC 20μsec/DIV 328mVp-p
IC801 ㉗ PB PAL 200mV/DIV 20μsec/DIV
IC801 ㉗ PB NTSC 20μsec/DIV 696mVp-p
IC001 (50) REC PAL 20μsec/DIV 800mVp-p
IC001 (50) REC NTSC 20μsec/DIV 832mVp-p
IC001 ㊼ REC PAL 10mV/DIV 20μsec/DIV
IC001 ㊼ REC NTSC 20mV/DIV 20μsec/DIV
IC001 ㊺ REC PAL 368mVp-p
IC001 ㊺ REC NTSC 640mVp-p
IC001 ㉝ REC PAL 260mVp-p
IC001 ㉝ REC NTSC 292mVp-p
IC001 ㉝ PB PAL 336mVp-p
IC001 ㉝ PB NTSC 352mVp-p
IC001 ㉜ REC PAL 248mVp-p
IC001 ㉜ REC NTSC 292mVp-p
IC001 ㉜ PB PAL 332mVp-p
IC001 ㉜ PB NTSC 336mVp-p
IC801 ㉙ REC PAL 20μsec/DIV 216mVp-p
IC801 ㉙ REC NTSC 20μsec/DIV 280mVp-p
CN802 ① REC PAL 20μsec/DIV 360mVp-p
CN802 ① REC NTSC 20μsec/DIV 544mVp-p
CN802 ② PB PAL 200mV/DIV 20μsec/DIV
CN802 ② PB NTSC 20μsec/DIV 576mVp-p
CN802 ③ REC/PB PAL 5.12Vp-p 40 msec
CN802 ③ REC/PB NTSC 5.2Vp-p 33.4 msec
IC001 ㉖ REC PAL 1.12Vp-p
IC001 ㉖ REC NTSC 1.08Vp-p
IC001 (51) PB PAL 84mVp-p
IC001 (51) PB NTSC 122mVp-p
IC001 (53) REC PAL 312mVp-p
IC001 (53) REC NTSC 300mVp-p
IC001 ⑥ REC/PB PAL 1.54Vp-p 4.43MHz
IC001 ⑥ REC/PB NTSC 1.48Vp-p 3.58MHz
IC001 ⑦ REC/PB PAL 1Vp-p 4.43MHz
IC001 ⑦ REC/PB NTSC 1.1Vp-p 3.58MHz
IC001 ⑳ REC PAL 696mV
IC001 ⑳ REC NTSC 696mV
436EE/X711
286EE/X311
EXCEPT X711AS/NZ
436EE/X711ME/SG/PS

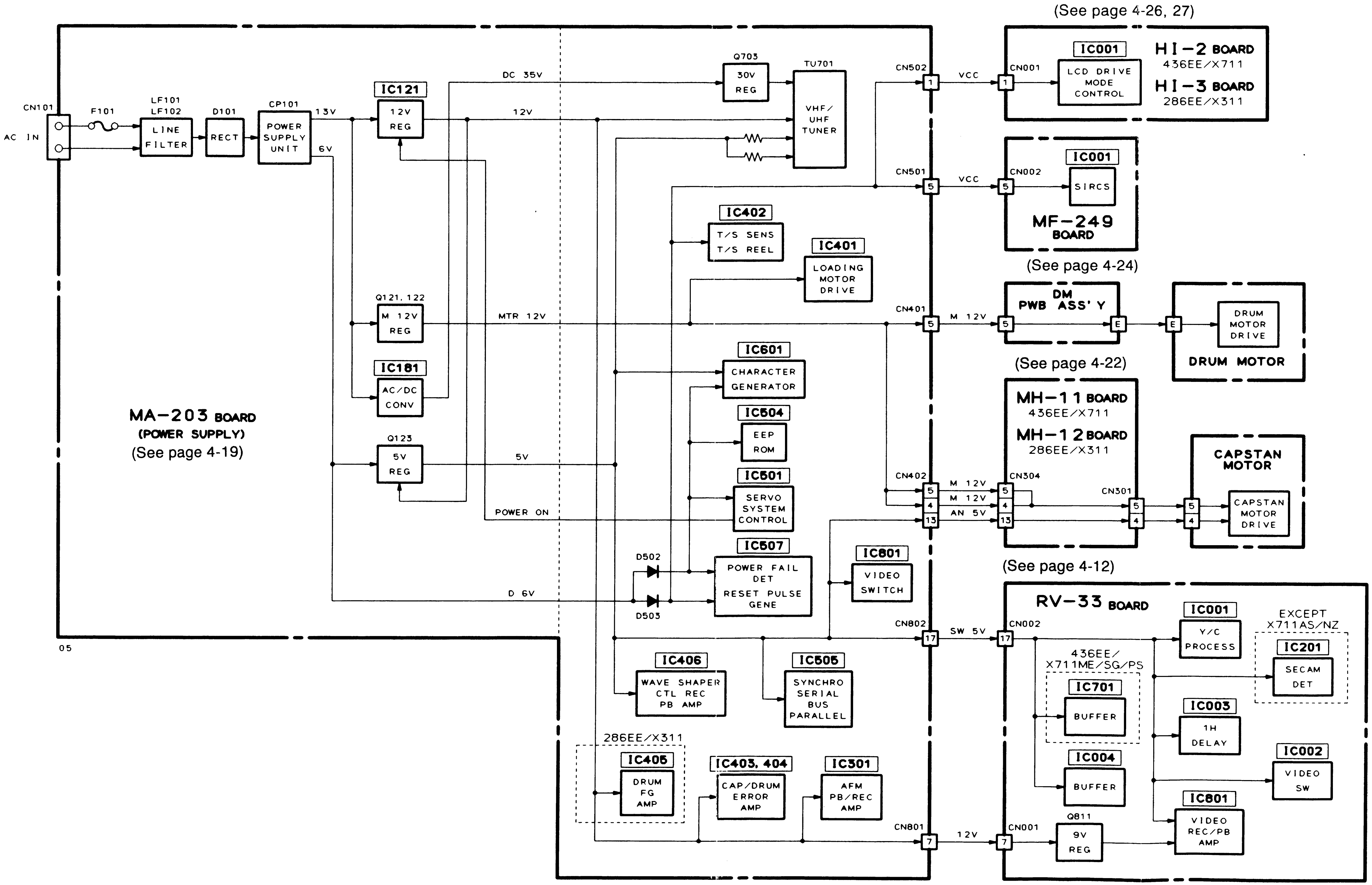

(27) PB PAL
V/DIV
µsec/DIV
(27) PB NTSC
µc/DIV
696mVp-p
IC001 (50) REC PAL
20µsec/DIV
800mVp-p
IC001 (50) REC NTSC
20µsec/DIV
832mVp-p
IC001 (47) REC PAL
10mV/DIV
20µsec/DIV
IC001 (47) REC NTSC
20mV/DIV
20µsec/DIV
IC001 (45) REC PAL
368mVp-p
IC001 (45) REC NTSC
640mVp-p
IC001 (33) REC PAL
260mVp-p
IC001 (33) REC NTSC
292mVp-p
IC001 (33) PB PAL
336mVp-p
IC001 (33) PB NTSC
352mVp-p
IC001 (32) REC PAL
248mVp-p
IC001 (32) REC NTSC
292mVp-p
IC001 (32) PB PAL
332mVp-p
IC001 (32) PB NTSC
336mVp-p
IC001 (43) PB PAL
100mV/DIV
20µsec/DIV
IC001 (43) PB NTSC 20µsec/DIV
290mVp-p
IC001 (28) REC PAL
2.04Vp-p
IC001 (28) REC NTSC
2.04Vp-p
IC001 (28) PB PAL
2.16Vp-p
IC001 (28) PB NTSC
2.2Vp-p
H
PB RF AGC AMP
BUFFER
Q641
DSF
Q904 Q906-908 D801
Q938 939
CHARACTER SWITCH
Q931
BUFFER
Q909
PB MIX AMP
Q040
SWITCH
Q047
Q048
436EE ×711
436EE ×711
Q820 821
ENV DET
Q839
Q822
Q034
REC BUFFER
Q013
REC BUFFER
Q021
SWITCH
Q012
SWITCH
RV004 WHITE CLIP
EMPH
RV005 DEVIAITON
RV006 CARRIER
RV001 AGC
IC001
Y/C PROCESS
RV003 PB LEVEL
LIM
FM DEMOD
LPF
MAIN DE-EMPH
MAIN EMPH
FM MOD
÷2
Y LPF
NL DE-EMPH
NL EMPH
NOISE CANCEL
Q051
PB 5V
SWITCH
4.43M TRAP
Q011
BUFFER
DROP OUT DET
5V REG
SW 5V
DO
REC
PB
DETAIL EMPH (PB THROUGH)
Y NR
Y APT
PICTURE CONT
SYNC SEP
Y/C MIX COLOR KILLER
6dB
REC EE
IC003
1H CCD DELAY LINE
1H DELAY
8.86M BPF
Q041 046
BUFFER
Q006 007
LPF
AGC
BPF
2M LPF
PULSE GEN
ACC
CHECK
XTAL VCO/OSC
AFC APC
DOWN CONV
4Φ GEN
MAIN CONV
DISCRI
1/2
2fc VCO
3.58MHz 4.43MHz BPF
BURST EMPH DE-EMPH
1.3MHz LPF
DELEY
KIL AMP REC
BG PULSE
SERIAL CONTROL INTERFACE
RV009 REC C LEVEL
X001 4.43M
Q001 OSC
X002 3.58M
Q002 OSC
436EE/×711ME/SG/PS
T1
5V
TANK COIL 10.1MHz
Q014
BUFFER
Q005
SWITCH
Q049
SWITCH
Q004
BUFFER
DL003 PAL
DL002 N4.43M
DL001 N3.58M
436EE ×711ME/SG/PS
IC002
VIDEO INPUT SW
SW 5V
Q003
BUFFER
D001
CN002 (1/2)
VIDEO
COMP SYNC
IC701
436EE/×711ME/SG/PS
Q030 032
SWITCH
Q027
SWITCH
EXCEPT ×711AS/NZ
Q018
IC004
Q055
EXCEPT ×711AS NZ
Q201
BUFFER
IC201
SECAM DET
COMP
CF201
4.5M FIL
LIM
T201
7.8µ
RV201 MESECAM
Q016
PB 5V
SWITCH
MESECAM
RF SWP
V TAPE
NTSC
CN002 (1/2)
REC ON
DATA
CLOCK
3.58MHz
INT JUDGE
SYSTEM CONTROL BLOCK
IC001 (6) REC/PB PAL
1.54Vp-p
4.43MHz
IC001 (6) REC/PB NTSC
1.48Vp-p
3.58MHz
IC001 (7) REC/PB PAL
1Vp-p
4.43MHz
IC001 (7) REC/PB NTSC
1.1Vp-p
3.58MHz
IC001 (20) REC PAL
696mV
IC001 (20) REC NTSC
696mV
IC001 (14) PB PAL
584mVp-p
IC001 (14) PB NTSC
568mVp-p
IC001 (14) REC PAL
664mVp-p
IC001 (14) REC NTSC
632mVp-p
CN802 (1/2)
VIDEO
IC801
VIDEO SW
AN 5V
FROM TUNER BLOCK
NA PB
LINE 1
FROM SYSTEM CONTROL BLOCK
CN001 (1/4)
VIDEO LINE IN
IC601 (5) REC/PB PAL
2.5Vp-p
17.73MHz
IC601
CHARACTER GENERATOR
X601
CS (8)
S IN (9)
S CLK (10)
RST (15)
OSD ENABL
S IN
S CLK
SYS RST
FROM SYSTEM CONTROL BLOCK
Q605
BUFFER
SYNC I
CV I
CV O
SYNC DET
CT601
Q604
BUFFER
Q712
VIDEO OUT AMP
TO TUNER BLOCK
CN001 (2/4)
VIDEO LINE OUT
Q630
SYNC SEP
Q602
V SYNC SEP
5V
Q601
D601
H DET
V SYNC
FROM SYSTEM CONTROL BLOCK
MA-203BOARD (1/8) (See page 4-19)
IC801 (8) REC PAL
0.7Vp-p
IC801 (8) REC NTSC
1.1Vp-p
IC601 (16),(18) REC/PB PAL
2.2Vp-p
IC601 (16),(18) REC/PB NTSC
2.1Vp-p
IC601 (20) REC/PB PAL
1.9Vp-p
IC601 (20) REC/PB NTSC
1.8Vp-p
IC001 (18) REC PAL
92mVp-p
IC001 (18) REC NTSC
118mVp-p
IC001 (16) REC PAL
688mVp-p
IC001 (16) REC NTSC
608mVp-p
IC001 (16) PB PAL
592mVp-p
IC001 (16) PB NTSC
576mVp-p

3-3. SERVO, SYSTEM CONTROL BLOCK DIAGRAM


MA-203 BOARD (2/5)
(See page 4-19)
IC501 ⑥⑧ REC/PB PAL
4.2Vp-p
25Hz
IC501 ⑥⑧ REC/PB NTSC
4.1Vp-p
30Hz
IC501 ⑥⑨ REC/PB PAL
5Vp-p
300Hz
IC501 ⑥⑨ REC/PB NTSC
5Vp-p
360Hz
IC501 ④② REC/PB
16MHz
DRUM MOTOR BOARD (1/2)
DRUM PG
DRUM FG
M901
DM PWB ASS'Y
CN009
CN007
DRUM PG
COMMON
DRUM FG
CN401 (1/3)
REF 2.5V
436EE/×711
JR401
IC404 (1/2) DRM PG AMP
+12V
IC405 (1/2) DRM PG AMP
REF 2.5V
436EE/×711
JR402
IC406 (1/3) WAVE SHAPER
IC405 (2/2) DRM FG AMP
286EE/×311
IC501 (1/2) SERVO
68 DRUM PG
69 DRUM FG
DRUM D/A 74
IC403 (1/2) DRUM ERROR INTEGRATOR
REF 2.5V
CN401 (2/3)
MTR 12V
DM PWB ASS'Y
CNC
D VS
MTR 12V
DRUM MOTOR BOARD (2/2)
M901
OUTPUT
OUTPUT
MATRIX
HALL DEVICE
VCC
IC501 ⑧⑥ REC/PB PAL
2.3Vp-p
32.768KHz
(See page 4-22)
MH-11 BOARD (1/3)
436EE/×711
MH-12 BOARD (1/3)
286EE/×311
CAPSTAN MOTOR BOARD (1/2)
CAPSTAN FG
M902
CN301 (1/2)
CN304 (1/2)
CAP FG
CN402 (1/3)
IC404 (2/2) CAPSTAN FG AMP
70 CAP FG
CAP DA 73
CAP STOP 34
STEP PLS 14
IC403 (2/2) CAPSTAN ERROR INTEGRATOR
REF 2.5V
D401
IC406 (3/3) REFERENCE VOLTAGE
AN5V
REF 2.5V
CN402 (2/3)
(See page 4-22)
CN304 (2/3)
CN301 (2/2)
CAP VS
MH-11 BOARD (2/3)
436EE/×711
MH-12 BOARD (2/3)
286EE/×311
REF
CAP RVS
LIMITER
MTR 12V
AN 5V
CNB
IC1 (2/2)
M902
23 VS
U 14
V 15
W 16
CAPSTAN MOTOR
AN 5V
U(+) U(-) V(+) V(-) W(+) W(-)
HALL DEVICE
27 REF
32 FRC
21 TL
17 VM
15 VCC
CAPSTAN MOTOR BOARD (2/2)
CAP RVS 72
CAP TRQ1 35
CAP TRQ2 36
MTR 12V
AN 5V
IC501 ⑦⓪ REC/PB PAL
4.2Vp-p
1.3 msec
IC501 ⑦⓪ REC/PB NTSC
4.2Vp-p
928 μsec
IC406 (2/3) CTL REC/PB AMP
5V
VCC
INDEX 11
REC INH 13
REC CTL GEN
TIMING GEN
PB
REC CTL
3 VALUE DET H) REC CTL L) OPEN PB
RC
75 CTL REC
7 REC CTL
67 PB CTL
CN407
CTL (Y)
CTL (X)
CTL HEAD
PB CTL AMP
GCA
PB CTL AMP
LEVEL DET
PB CTL LOGIC
CTL
BIAS 2.4V
PEAK DET
RTG MMV
DC (2.4V)
AMP GAIN
TIME CONST
76 CTL STEP
CN406
CTL CHECK
05
IC501 ⑥⑦ PB PAL
5.3Vp-p
25Hz
IC501 ⑥⑦ PB NTSC
5.1Vp-p
30Hz
IC501 ⑦ REC PAL
5Vp-p
25Hz
IC501 ⑦ REC NTSC
4.9Vp-p
30Hz
FL PWB ASS'Y
C OUT
C START
C IN
CND
(See page 4-22)
CN303
CN304
C OUT
C START
C IN
GND
CN402 (3/3)
MH-11 BOARD (3/3)
436EE/×711
MH-12 BOARD (3/3)
286EE/×311
M903 LOADING MOTOR
CNA
CN302
CAM M
CAM P
BASE PWB ASS'Y
ROTARY SWITCH (MECHA POSITION)
MODE 1
MODE 2
MODE 3
MODE 4
END LED
T REEL FG
T SENS
T REEL FG
TAPE LED
TAKE UP END SENSOR
T SENSOR PWB ASS'Y
CNC
S SENS
SUPPLY END SENSOR
S SENSOR PWB ASS'Y
S REEL FG
REC SAFTY
S REEL FG
REC SAFTY
DM PWB ASS'Y
CN401 (3/3)


IC501 (69) REC/PB PAL
5Vp-p
300Hz
IC501 (69) REC/PB NTSC
5Vp-p
360Hz
IC403 (1/2)
DRUM ERROR INTEGRATOR
REF 2.5V
DM PWB ASS'Y
D VS
MTR 12V
CN401 (2/3)
DRUM MOTOR BOARD (2/2)
M901
OUTPUT
MATRIX
HALL DEVICE
VCC
IC405 (2/2)
CAPSTAN ERROR INTEGRATOR
D401
IC406 (3/3)
REFERENCE VOLTAGE
AN5V
REF 2.5V
STOP
P PLS
P RVS
TRQ1
TRQ2
(See page 4-22)
CN402 (2/3)
CN304 (2/3)
CN301 (2/2)
CAP VS
MH-11 BOARD (2/3) 436EE/X711
MH-12 BOARD (2/3) 286EE/X311
REF
CAP RVS
LIMITER
MTR 12V
AN 5V
CNB
IC1 (2/2)
M902
CAPSTAN MOTOR
HALL DEVICE
FRC
TL
VM
VCC
CAPSTAN MOTOR BOARD (2/2)
IC501 (70) REC/PB PAL
4.2Vp-p
1.3 msec
IC501 (70) REC/PB NTSC
4.2Vp-p
928 μsec
IC501 (7) REC PAL
5Vp-p
25Hz
IC501 (7) REC NTSC
4.9Vp-p
30Hz
IC501 (42) REC/PB PAL
5.3Vp-p
16MHz
IC501 (86) REC/PB PAL
2.3Vp-p
32.768KHz
FL PWB ASS'Y
C OUT
C START
C IN
CND
(See page 4-22)
CN303
CN304
CN402 (3/3)
GND
MH-11 BOARD (3/3) 436EE/X711
MH-12 BOARD (3/3) 286EE/X311
CN302
CAM M
CAM P
M903 LOADING MOTOR
BASE PWB ASS'Y
CNA
ROTARY SWITCH (MECHA POSITION)
MODE1
MODE2
MODE3
MODE4
END LED
T REEL FG
T SENS
T REEL FG
TAPE LED
T SENSOR PWB ASS'Y
TAKE UP END SENSOR
SUPPLY END SENSOR
CNC
S SENS
S SENSOR PWB ASS'Y
S REEL FG
REC SAFTY
S REEL FG
REC SAFTY
DM PWB ASS'Y
CN401 (3/3)
IC401
LOADING MOTOR DRIVE
MTR 12V
Q401
LED DRIVE
IC402 (1/2)
TAPE END DETECT
REF 2.5V
IC402 (2/2)
REEL FG AMP
IC501 (2/2)
SYSTEM CONTROL
D 6V
VDD
AVDD
AVREF
X501 16MHz
XTAL
EXTAL
X502 32.768kHz
TX
TEXL
RV502 SWITCHING POSITION
RF POS
C OUT
C START
C IN
CAM M
CAM P
MODE 1
MODE 2
MODE 3
MODE 4
END LED
T SENS
S SENS
T REEL FG
S REEL FG
REC SAF
EXP SO
EXP CLK
HEAD CONT
REC P
REC
RF ENV
SP
SECAM
ME SECAM
3.58MHz
LP JOG
QVD
QHD ENABLE
E TAPE
NTSC
V PB
RF SWP
NT JUDGE
H DET
V SYNC
OSD ENABLE
LINE 1
NA PB
NA REC P
A MUTE
SYS RST
S OUT
S CLK
S IN
LCD CS
RMC
SYS RESET
EEPR CS
R/B
POWER FAIL
COSMO RESET
TU ENABLE
TU CLOCK
TU DATA
F MONO
AFT
POEWR ON
436EE/X711
AN 5V
IC506
SYNCHRONIZED SERIAL BUS PARALLEL
DRIVE
Q501
SWITCH
CN801
REC ORC
ENV CONT
HEAD CONT
REC P
REC
RF ENV
RF SP
SECAM
ME SECAM
FROM To VIDEO BLOCK
436EE/X711
Q505
SWITCH
Q570
SWITCH
CN802 (2/3)
OPC ON
3.58MHz
PB
D501
DATA
CLOCK
QVD
E TAPE
NTSC
V PB
RF SWP
NT JUDGE
H DET
V SYNC
OSD ENABLE
LINE 1
NA PB
SYS RST
S IN
S CLK
FROM/To VIDEO BLOCK
SP
LINE 1
NA PB
NA REC P
MUTE
To AUDIO BLOCK
SYS RESET
COSMO SO
COSMO S CLK
COSMO SI
LCD CS
RMC
FROM To MODE CONTROL BLOCK
IC504
EEP ROM
IC507
POWER FAIL DET
RESET PULSE GEN
D6V
D503
D507
PLL ENABLE
PLL CLK
PLL DATA
SW 1
AFT
FROM To TUNER BLOCK
POEWR ON
To REG BLOCK
IC501 (1) REC/PB PAL
5.1Vp-p
25Hz
IC501 (1) REC/PB NTSC
5Vp-p
30Hz
IC501 (66) REC/PB PAL
5.2Vp-p
20 msec
IC501 (66) REC/PB NTSC
5.2Vp-p
17.5 msec

3-7. POWER SUPPLY BLOCK DIAGRAM


(See page 4-26, 27)
AC IN
CN101
F101
LF101
LF102
LINE FILTER
D101
RECT
CP101
POWER SUPPLY UNIT
13V
6V
IC121
12V REG
DC 35V
12V
Q703
30V REG
TU701
VHF/UHF TUNER
CN502
1
VCC
CN001
1
IC001
LCD DRIVE MODE CONTROL
HI-2 BOARD
436EE/X711
HI-3 BOARD
286EE/X311
CN501
5
VCC
CN002
5
IC001
SIRCS
MF-249 BOARD
IC402
T/S SENS
T/S REEL
IC401
LOADING MOTOR DRIVE
(See page 4-24)
Q121, 122
M 12V REG
MTR 12V
CN401
5
M 12V
DM PWB ASS' Y
5
E
E
DRUM MOTOR DRIVE
DRUM MOTOR
IC181
AC/DC CONV
IC601
CHARACTER GENERATOR
(See page 4-22)
MA-203 BOARD
(POWER SUPPLY)
(See page 4-19)
IC504
EEP ROM
MH-11 BOARD
436EE/X711
MH-12 BOARD
286EE/X311
Q123
5V REG
5V
IC501
SERVO SYSTEM CONTROL
CN402
5
4
13
M 12V
M 12V
AN 5V
CN304
5
4
13
CN301
5
4
5
4
CAPSTAN MOTOR
CAPSTAN MOTOR DRIVE
POWER ON
IC507
POWER FAIL DET
RESET PULSE GENE
D502
D503
D 6V
IC801
VIDEO SWITCH
(See page 4-12)
RV-33 BOARD
CN802
17
SW 5V
CN002
17
IC001
Y/C PROCESS
EXCEPT X711AS/NZ
IC201
SECAM DET
05
IC406
WAVE SHAPER CTL REC PB AMP
IC505
SYNCHRO SERIAL BUS PARALLEL
436EE/
X711ME/SG/PS
IC701
BUFFER
IC003
1H DELAY
286EE/X311
IC405
DRUM FG AMP
IC403, 404
CAP/DRUM ERROR AMP
IC301
AFM PB/REC AMP
IC004
BUFFER
IC002
VIDEO SW
Q811
9V REG
IC801
VIDEO REC/PB AMP
CN801
7
12V
CN001
7

SECTION 4
PRINTED WIRING BOARDS
AND
SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

For printed wiring boards:
- o——— : indicates a lead wire mounted on the component side.
- •——— : indicates a lead wire mounted on the printed side.
- ○ : Through hole.
- ■ : Parts mounted on the conductor side.
- ░ : Pattern from the side which enables seeing.
- ░ : Pattern of the rear side.*
- Circled numbers refer to waveforms.

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

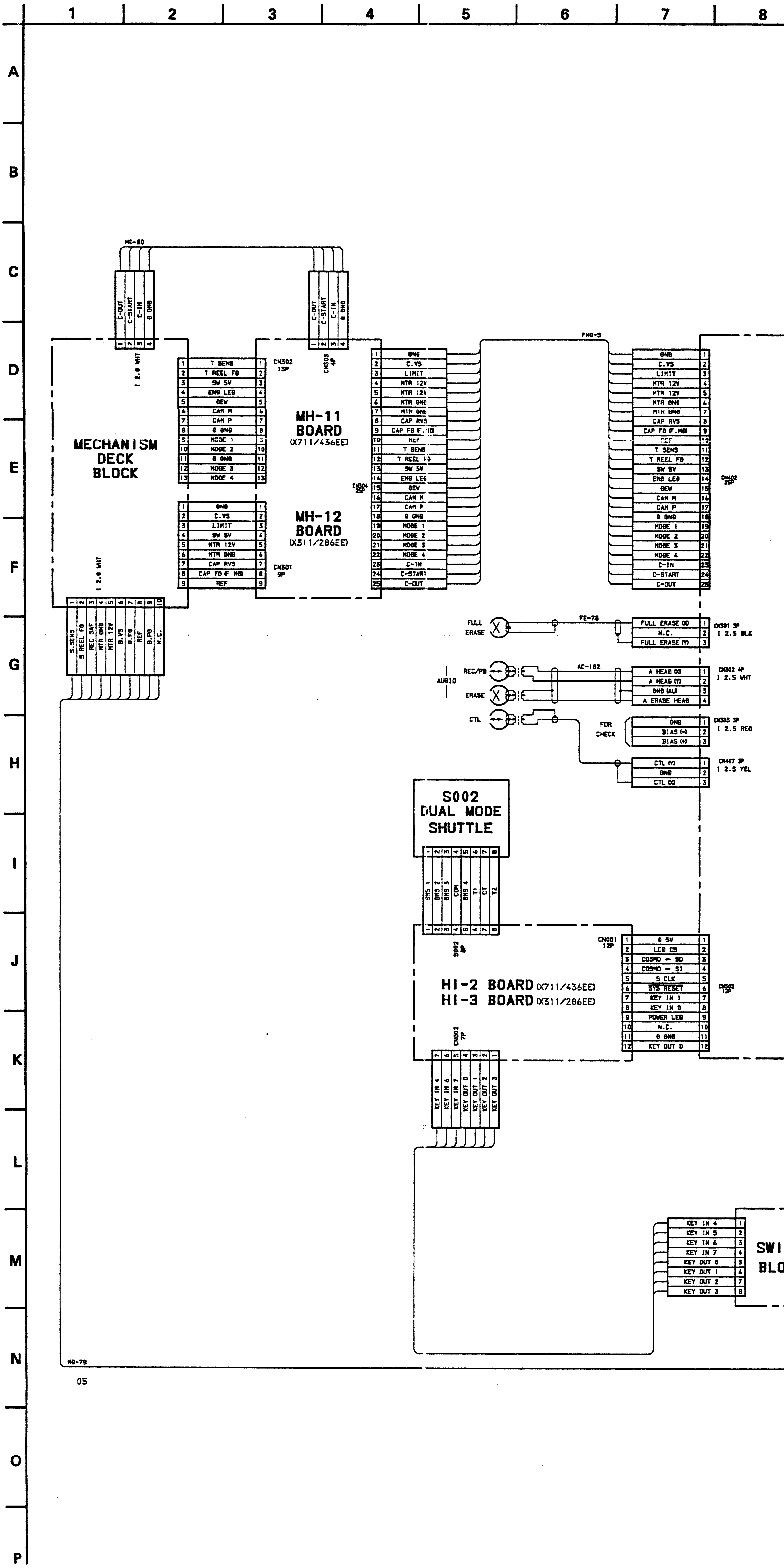
For schematic diagram:
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4W (Chip resistors: 1/10W) unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF: μμF 50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊟ : nonflammable resistor.
- ⊟ : fusible resistor.
- ▭ : panel designation.
- △ : internal component.
- ▭ : adjustment for repair.*
- ━━ : B + Line.*
- ━ ━ ━ : B − Line.*
- ⇨ : IN/OUT direction of B line (+ , −).*
- Circled numbers refer to waveforms.*
- Voltages are dc between measurement point.*
- Readings are taken with a color-bar signal input.*
- Readings are taken with a digital multimeter (DC10MΩ).*
- Voltage variations may be noted due to normal production tolerances.*

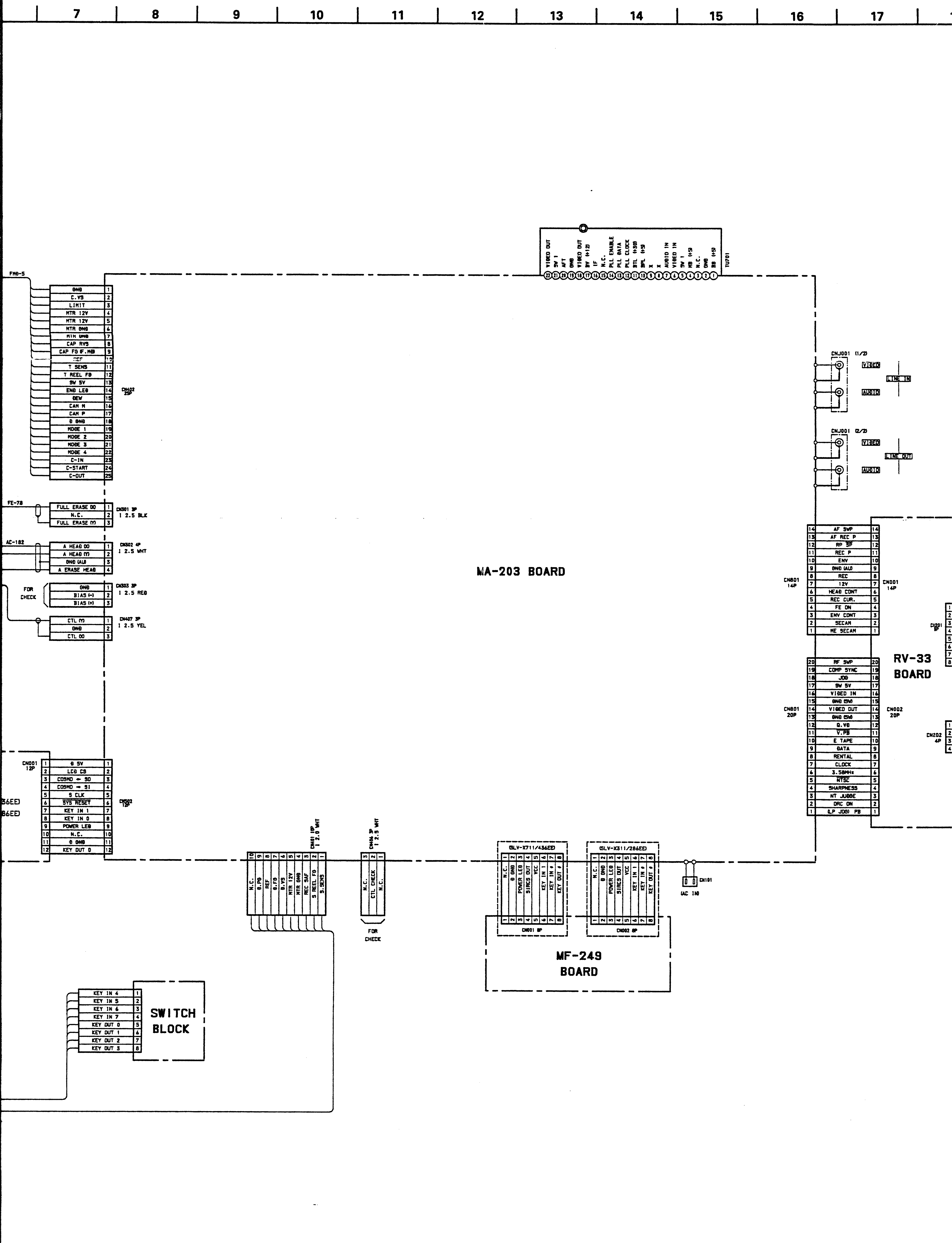
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

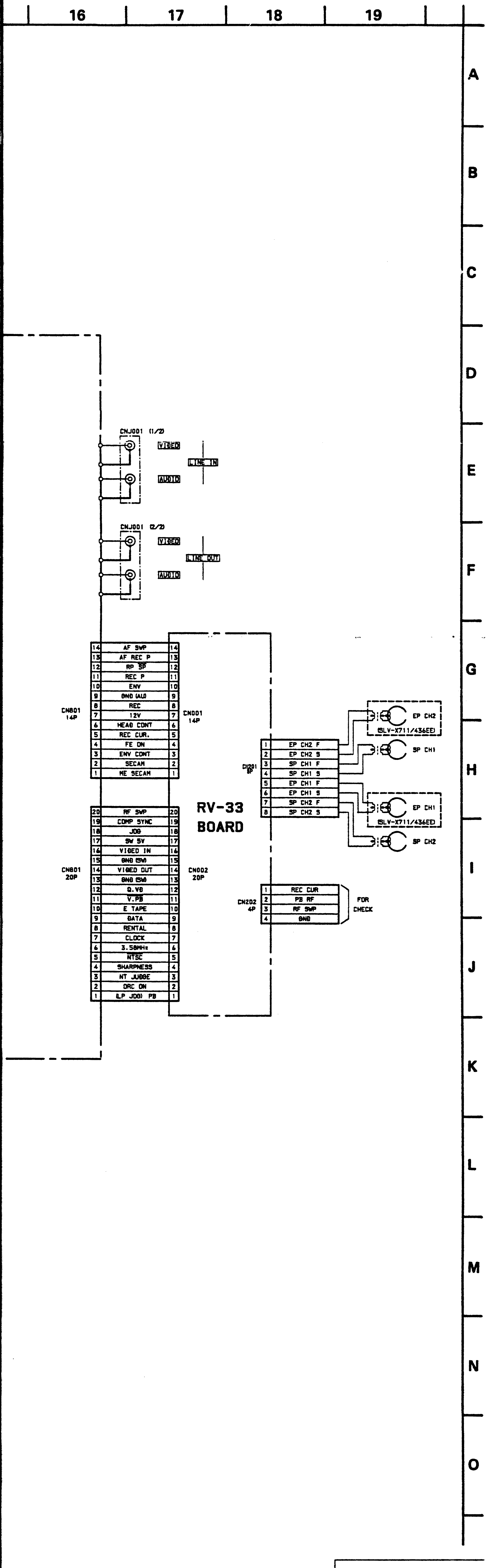
When indicating parts by reference number, please include the board name.

- * : indicated by the color red.

4-1. FRAME SCHEMATIC DIAGRAM


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
MD-80
C-OUT
C-START
C-IN
D GND
1 2.0 WHT
MECHANISM DECK BLOCK
T SENS
T REEL FG
SW 5V
END LED
DEW
CAM M
CAM P
D GND
MODE 1
MODE 2
D GND
MODE 3
MODE 4
CN302 13P
CN303 4P
MH-11 BOARD (X711/436EE)
GND
C.VS
LIMIT
SW 5V
MTR 12V
MTR GND
CAP RVS
CAP FG (F MD)
REF
MH-12 BOARD (X311/286EE)
CN301 9P
CN304 25P
MTR 12V
MTR GND
CAP FG (F.MD)
C-IN
C-START
C-OUT
S.SENS
S REEL FG
REC SAF
MTR GND
MTR 12V
D.VS
D.FG
REF
D.PG
N.C.
FMD-5
CN402 25P
FULL ERASE
FE-78
FULL ERASE (X)
N.C.
FULL ERASE (Y)
CN501 3P
1 2.5 BLK
AUDIO
REC/PB
ERASE
CTL
AC-182
A HEAD (X)
A HEAD (Y)
GND (AU)
A ERASE HEAD
CN502 4P
1 2.5 WHT
FOR CHECK
GND
BIAS (−)
BIAS (+)
CN503 3P
1 2.5 RED
CTL (Y)
GND
CTL (X)
CN407 3P
1 2.5 YEL
S002 DUAL MODE SHUTTLE
GMS 1
GMS 2
GMS 3
COM
GMS 4
T1
CT
T2
S002 8P
HI-2 BOARD (X711/436EE)
HI-3 BOARD (X311/286EE)
CN001 12P
D 5V
LCD CS
COSMO ← SO
COSMO → SI
S CLK
SYS RESET
KEY IN 1
KEY IN 0
POWER LED
N.C.
D GND
KEY OUT 0
CN502 12P
CN002 7P
KEY IN 4
KEY IN 5
KEY IN 6
KEY IN 7
KEY OUT 0
KEY OUT 1
KEY OUT 2
KEY OUT 3
SWI
BLO
MD-79
05

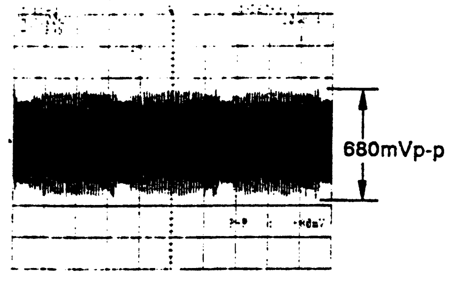

7
8
9
10
11
12
13
14
15
16
17
TU701
VIDEO OUT
SW 1
AFT
GND
VIDEO OUT
BY (+12)
IF
N.C.
PLL ENABLE
PLL DATA
PLL CLOCK
BTL (+30)
BPL (+5)
X
X
AUDIO IN
VIDEO IN
SW 1
MB (+5)
N.C.
GND
BB (+5)
FMD-5
GND
C.VS
LIMIT
MTR 12V
MTR 12V
MTR GND
MTR GND
CAP RVS
CAP FG (F.MD)
REF
T SENS
T REEL FG
SW 5V
END LED
DEW
CAM M
CAM P
D GND
MODE 1
MODE 2
MODE 3
MODE 4
C-IN
C-START
C-OUT
CN402 25P
FE-78
FULL ERASE (X)
N.C.
FULL ERASE (Y)
CN301 3P
I 2.5 BLK
AC-182
A HEAD (X)
A HEAD (Y)
GND (AU)
A ERASE HEAD
CN302 4P
I 2.5 WHT
FOR CHECK
GND
BIAS (−)
BIAS (+)
CN303 3P
I 2.5 RED
CTL (Y)
GND
CTL (X)
CN407 3P
I 2.5 YEL
MA-203 BOARD
CNJ001 (1/2)
VIDEO
AUDIO
LINE IN
CNJ001 (2/2)
VIDEO
AUDIO
LINE OUT
CN801 14P
CN001 14P
AF SWP
AF REC P
RP SP
REC P
ENV
GND (AU)
REC
12V
HEAD CONT
REC CUR.
FE ON
ENV CONT
SECAM
ME SECAM
CN201 8P
RV-33 BOARD
CN801 20P
CN002 20P
RF SWP
COMP SYNC
JOG
SW 5V
VIDEO IN
GND (SW)
VIDEO OUT
GND (SW)
Q.VD
V.PB
E TAPE
DATA
RENTAL
CLOCK
3.58MHz
NTSC
SHARPNESS
NT JUDGE
DRC ON
(LP JOG) PB
CN202 4P
CN001 12P
36EE)
86EE)
D 5V
LCD CS
COSMO ← SO
COSMO → SI
S CLK
SYS RESET
KEY IN 1
KEY IN 0
POWER LED
N.C.
D GND
KEY OUT 0
CN502 12P
CN401 10P
I 2.0 WHT
N.C.
D.PG
REF
D.FG
D.VS
MTR 12V
MTR GND
REC SAF
S REEL FG
S.SENS
CN406 3P
I 2.5 WHT
N.C.
CTL CHECK
N.C.
FOR CHECK
(SLV-X711/436EE)
(SLV-X311/286EE)
N.C.
D GND
POWER LED
SIRCS OUT
VCC
KEY IN 1
KEY IN 0
KEY OUT 0
CN001 8P
CN002 8P
CN101
(AC IN)
MF-249 BOARD
KEY IN 4
KEY IN 5
KEY IN 6
KEY IN 7
KEY OUT 0
KEY OUT 1
KEY OUT 2
KEY OUT 3
SWITCH BLOCK


16
17
18
19
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
CNJ001 (1/2)
VIDEO
LINE IN
AUDIO
CNJ001 (2/2)
VIDEO
LINE OUT
AUDIO
CN801 14P
CN001 14P
14 AF SWP
13 AF REC P
12 RP SP
11 REC P
10 ENV
9 GND (AU)
8 REC
7 12V
6 HEAD CONT
5 REC CUR.
4 FE ON
3 ENV CONT
2 SECAM
1 ME SECAM
CN801 20P
CN002 20P
20 RF SWP
19 COMP SYNC
18 JOG
17 SW 5V
16 VIDEO IN
15 GND (SW)
14 VIDEO OUT
13 GND (SW)
12 Q.VB
11 V.PB
10 E TAPE
9 DATA
8 RENTAL
7 CLOCK
6 3.58MHz
5 NTSC
4 SHARPNESS
3 NT JUDGE
2 DRC ON
1 (LP JOG) PB
RV-33 BOARD
CN201 8P
1 EP CH2 F
2 EP CH2 S
3 SP CH1 F
4 SP CH1 S
5 EP CH1 F
6 EP CH1 S
7 SP CH2 F
8 SP CH2 S
EP CH2
(SLV-X711/436EE)
SP CH1
EP CH1
(SLV-X711/436EE)
SP CH2
CN202 4P
1 REC CUR
2 PB RF
3 RF SWP
4 GND
FOR CHECK

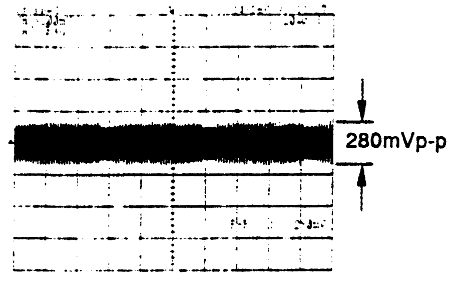
FRAME

RV-33 BOARD (NTSC 3.58 MODE)

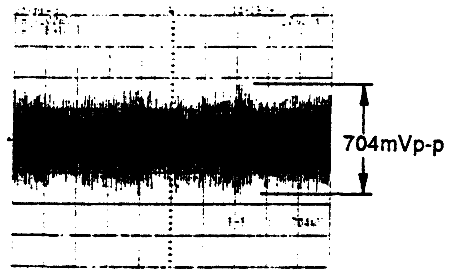
❶ IC801 ④ REC 20 μsec/DIV



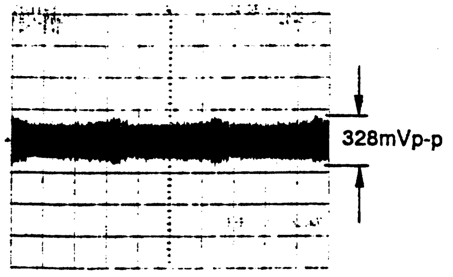
❷ IC801 ㉙ REC 20 μsec/DIV



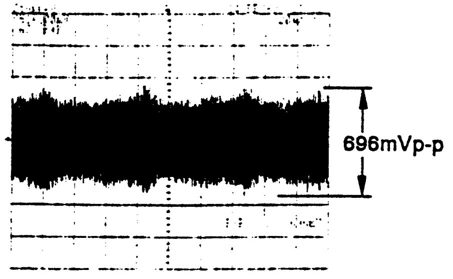
❸ IC801 ㉓ PB 20 μsec/DIV



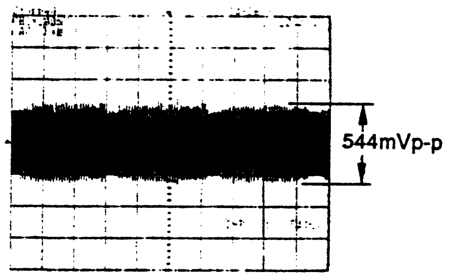
❹ IC801 ㉕ PB 20 μsec/DIV



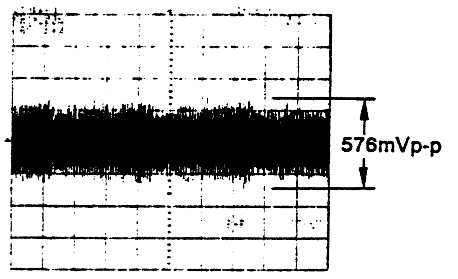
❺ IC801 ㉗ PB 20 μsec/DIV



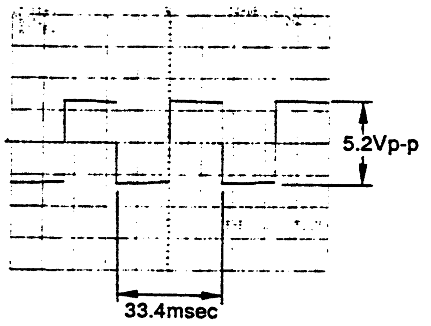
❻ CN802 ① REC 20 μsec/DIV



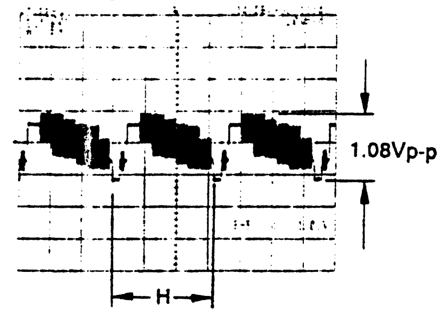
❼ CN802 ② PB 20 μsec



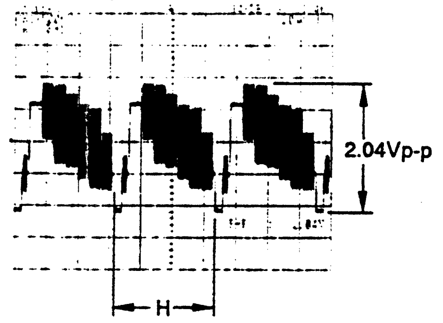
❽ CN802 ③ REC/PB



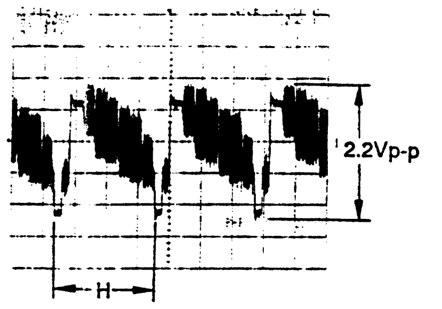
❾ IC001 ㉖ REC



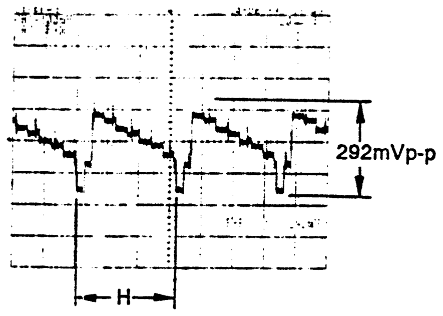
❿ IC001 ㉘ REC



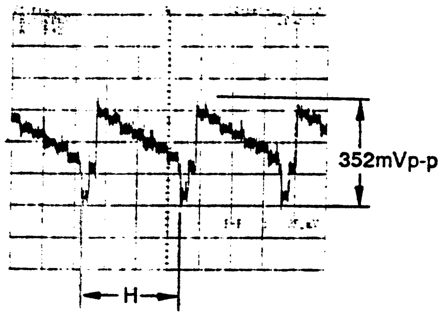
❿ IC001 ㉘ PB



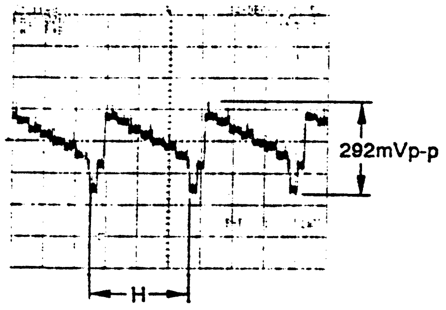
⓫ IC001 ㉝ REC



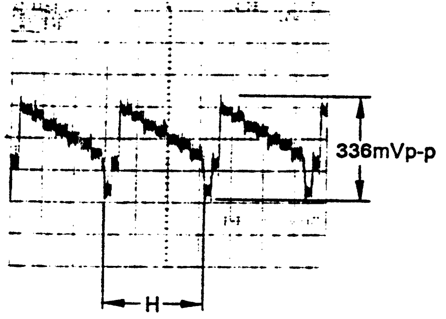
⓫ IC001 ㉝ PB



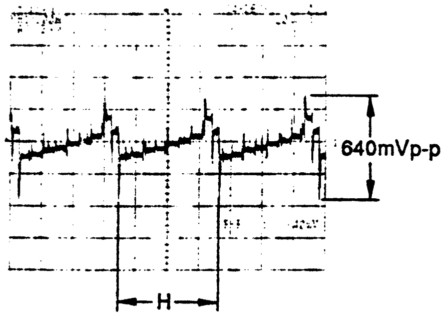
⓬ IC001 ㉜ REC



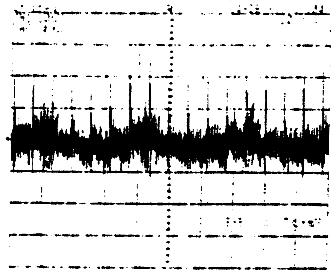
⓬ IC001 ㉜ PB



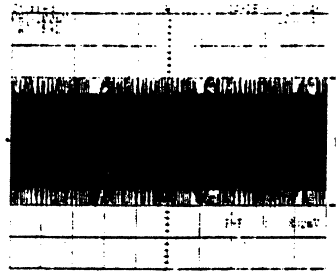
⓭ IC001 ㊺ REC



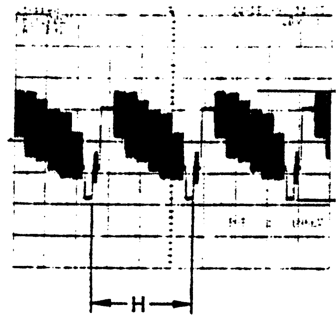
⓮ IC001 ㊼ REC 20 mV/DIV
20 μsec/DIV



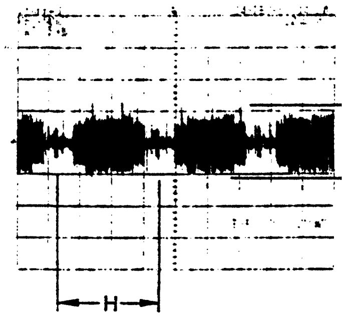
⓯ IC001 ㊿ REC 20 μsec/DIV



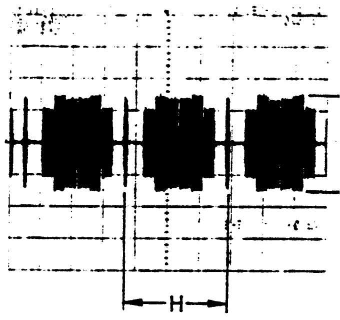
⓰ IC001 ⑳ REC



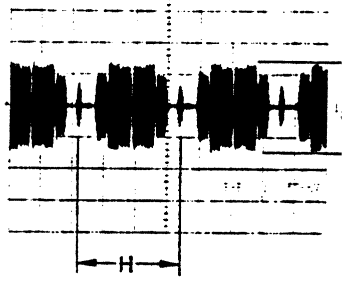
⓱ IC001 ⑱ REC



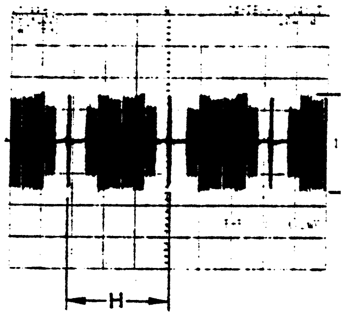
⓲ IC001 ⑯ REC



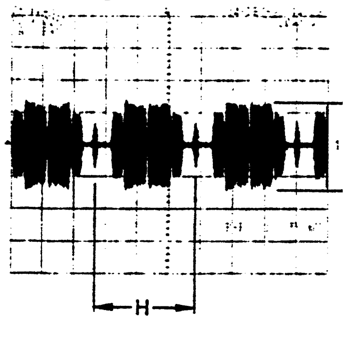
⓲ IC001 ⑯ PB



⓳ IC001 ⑭ REC

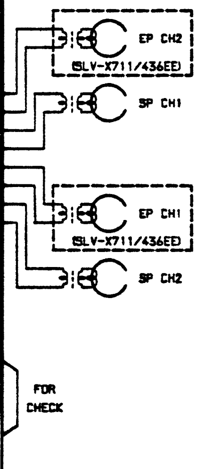


⓳ IC001 ⑭ PB



RV-33 BOARD (NTSC 3.58 MODE)

19



A
B
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D
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F
G
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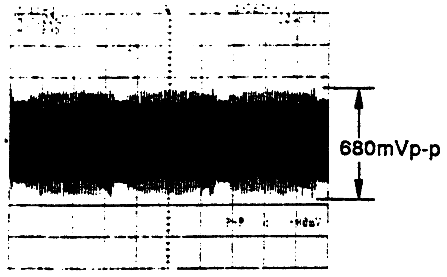
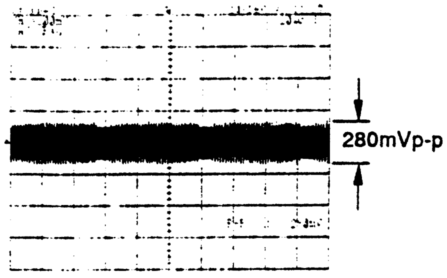
I
J
K
L
M
N
O

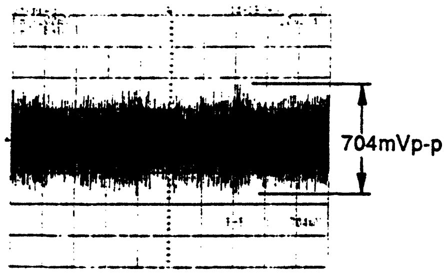
❶ IC801 ④ REC 20 μsec/DIV



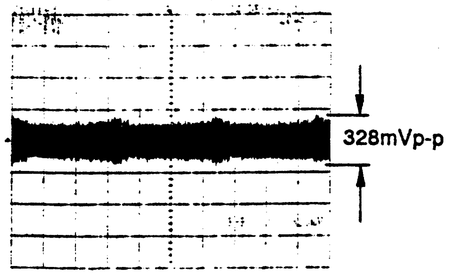
❷ IC801 ㉙ REC 20 μsec/DIV



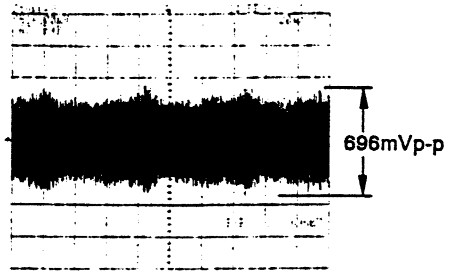
❸ IC801 ㉓ PB 20 μsec/DIV



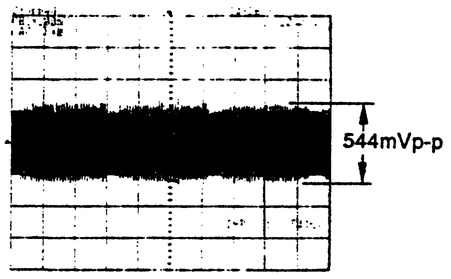
❹ IC801 ㉕ PB 20 μsec/DIV



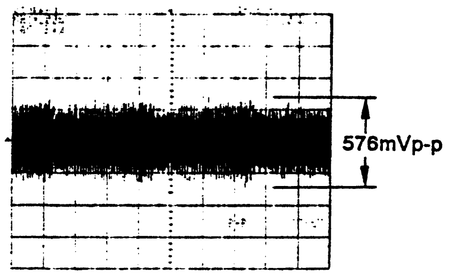
❺ IC801 ㉗ PB 20 μsec/DIV



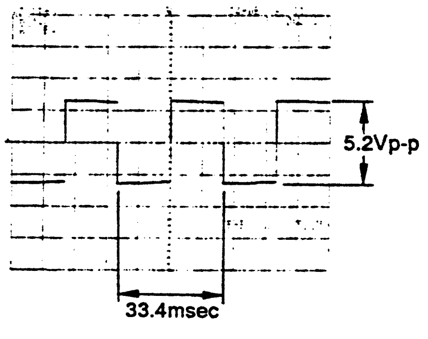
❻ CN802 ① REC 20 μsec/DIV



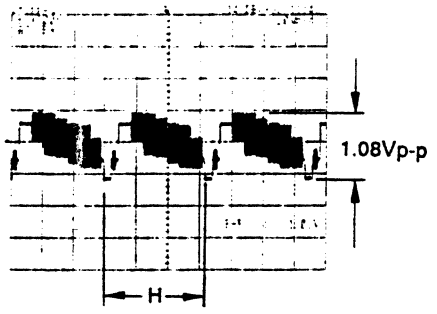
❼ CN802 ② PB 20 μsec



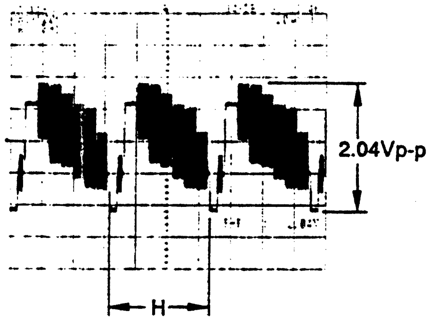
❽ CN802 ③ REC/PB



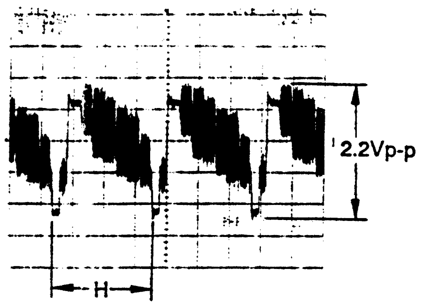
❾ IC001 ㉖ REC



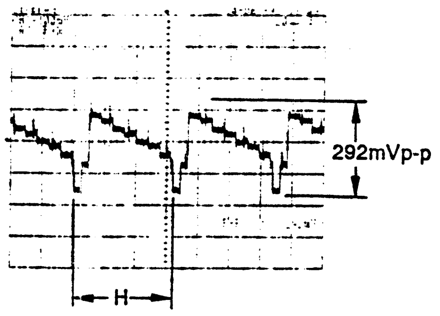
❿ IC001 ㉘ REC



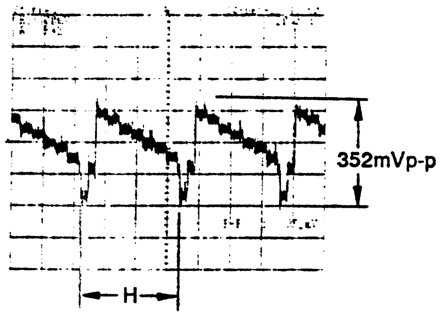
❿ IC001 ㉘ PB



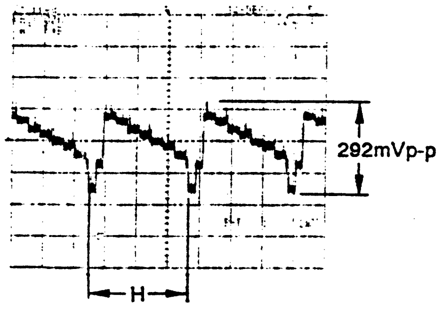
⓫ IC001 ㉝ REC



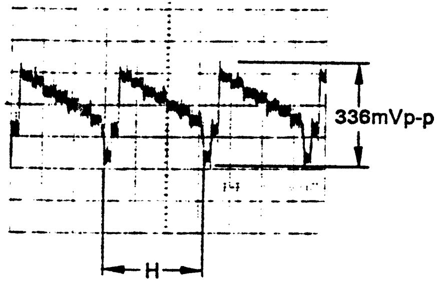
⓫ IC001 ㉝ PB



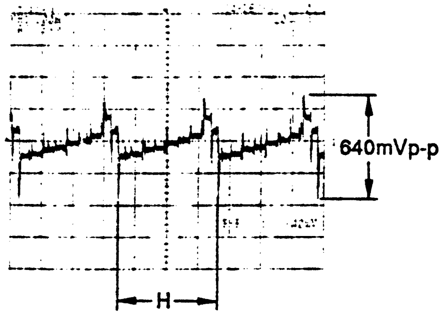
⓬ IC001 ㉜ REC



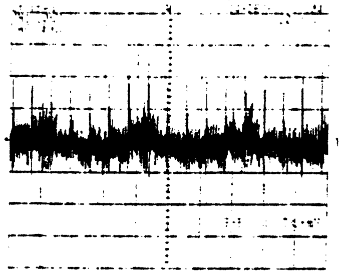
⓬ IC001 ㉜ PB



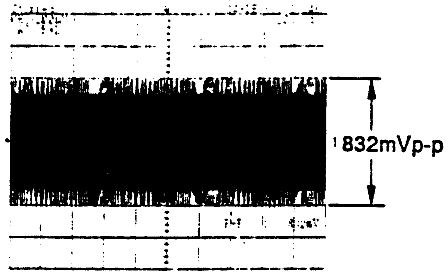
⓭ IC001 ㊺ REC



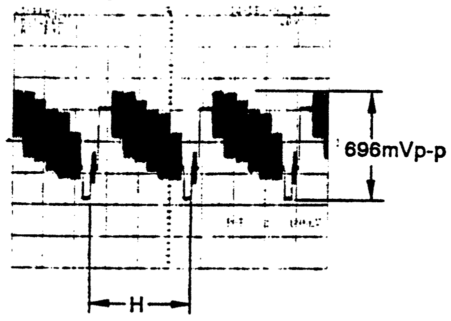
⓮ IC001 ㊼ REC 20 mV/DIV
20 μsec/DIV



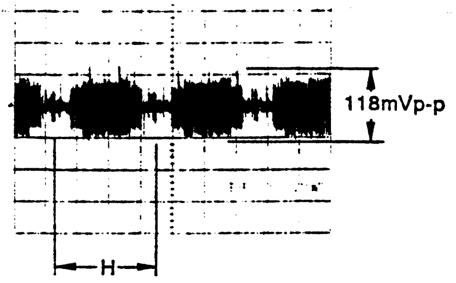
⓯ IC001 ㊿ REC 20 μsec/DIV



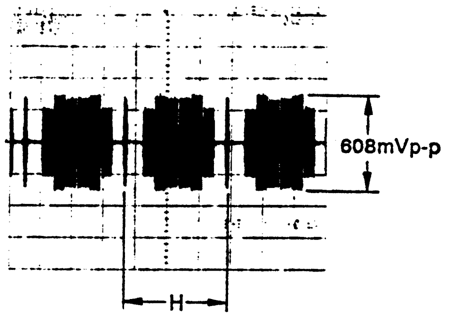
⓰ IC001 ⑳ REC



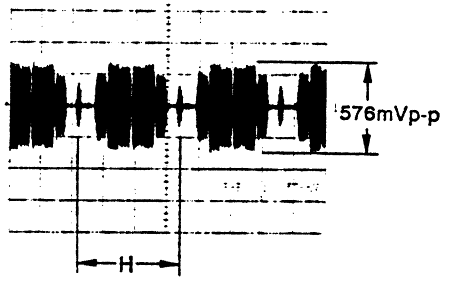
⓱ IC001 ⑱ REC



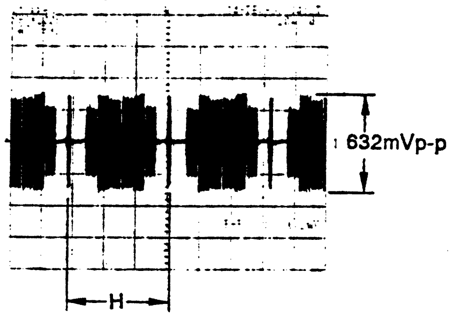
⓲ IC001 ⑯ REC



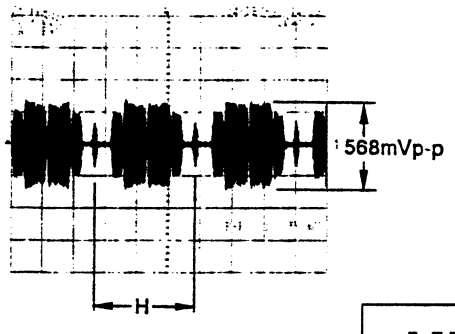
⓲ IC001 ⑯ PB



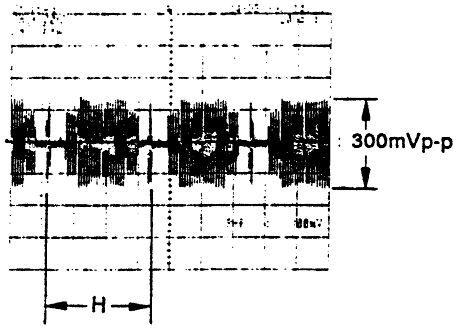
⓳ IC001 ⑭ REC



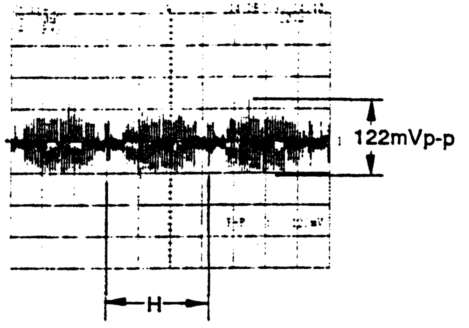
⓳ IC001 ⑭ PB



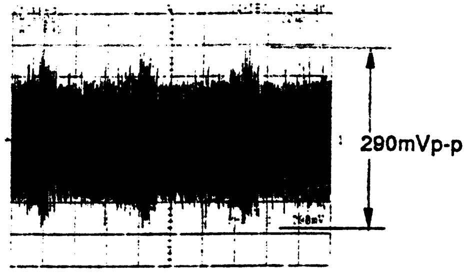
⓴ IC001 (53) REC



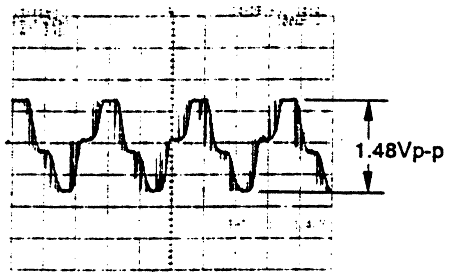
㉑ IC001 (51) PB



㉒ IC001 ㊸ PB 20 μsec/DIV

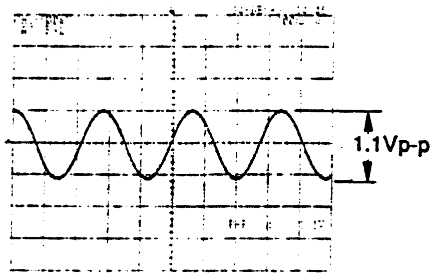


㉓ IC001 ⑥ REC/PB



3.58MHz

㉔ IC001 ⑦ REC/PB



3.58MHz

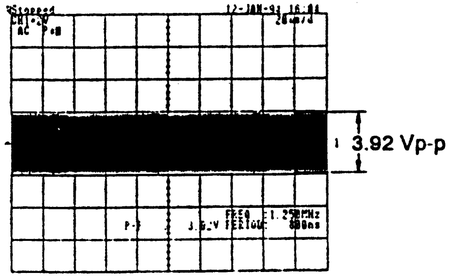
RV-33 BOARD (PAL MODE)

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

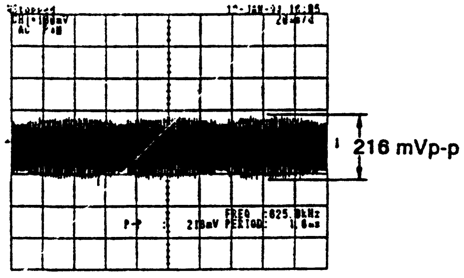
RV-33 (HEADAMP, VIDEO) PRINTED WIRING BOARD

– Ref. No.: RV-33 Board; 1,000 series –

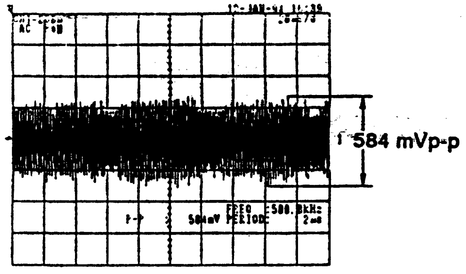
❶ IC801 ④ REC 20 μsec/DIV



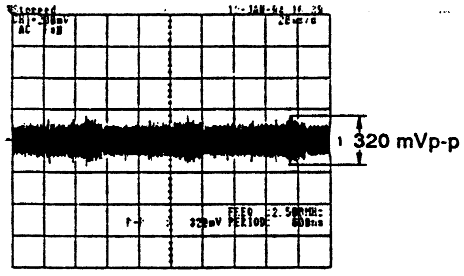
❷ IC801 ㉙ REC 20 μsec/DIV



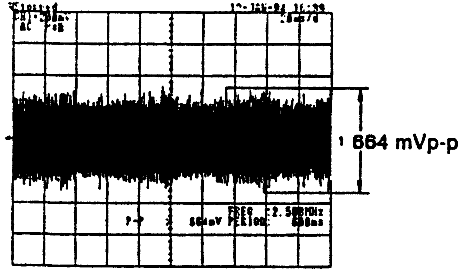
❸ IC801 ㉓ PB 20 μsec/DIV



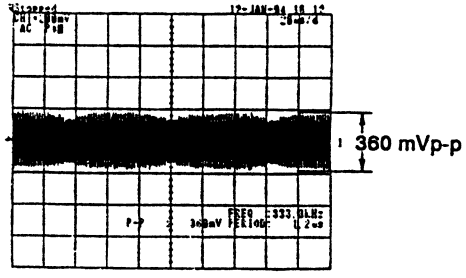
❹ IC801 ㉕ PB 20 μsec/DIV



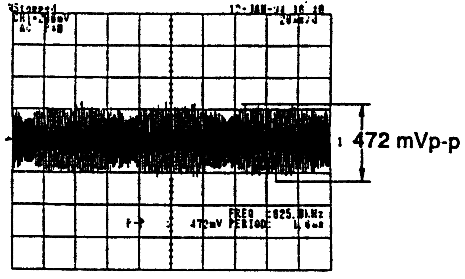
❺ IC801 ㉗ PB 20 μsec/DIV



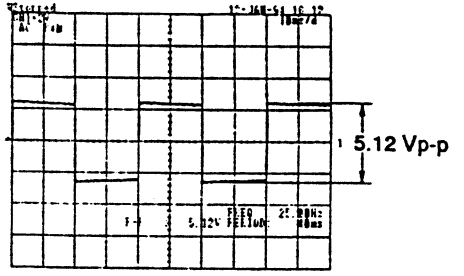
❻ CN802 ① REC 20 μsec/DIV



❼ CN802 ② PB 20 μsec/DIV

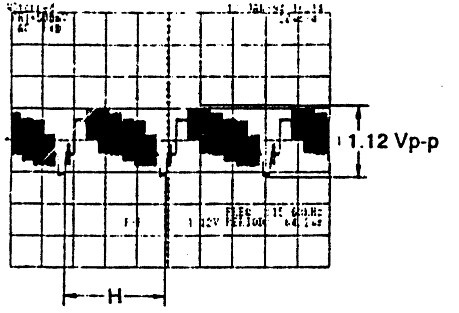


❽ CN802 ③ REC/PB

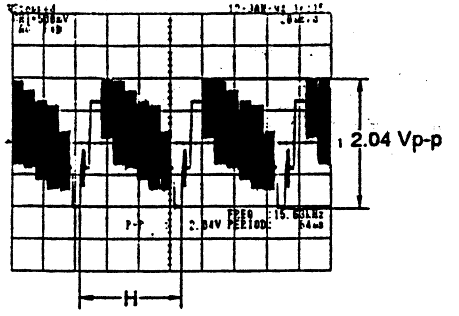


25 Hz

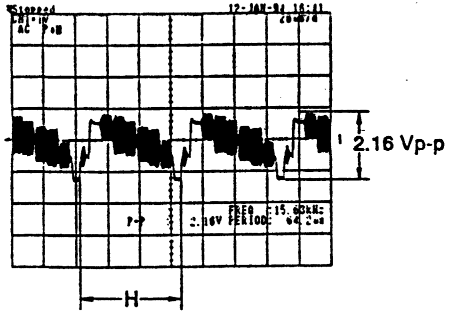
❾ IC001 ㉖ REC



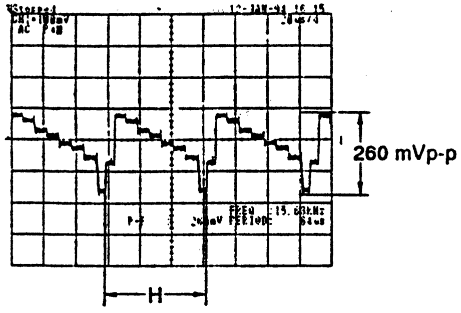
❿ IC001 ㉘ REC



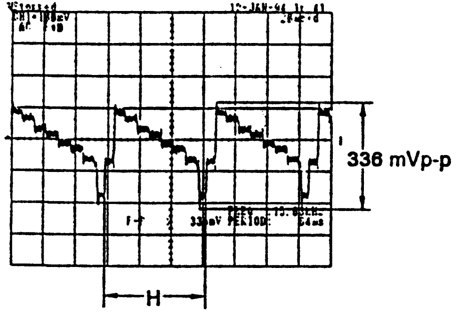
❿ IC001 ㉘ PB



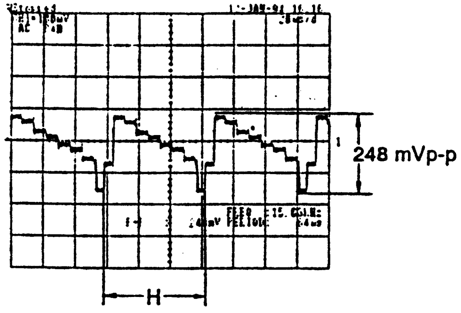
⓫ IC001 ㉝ REC



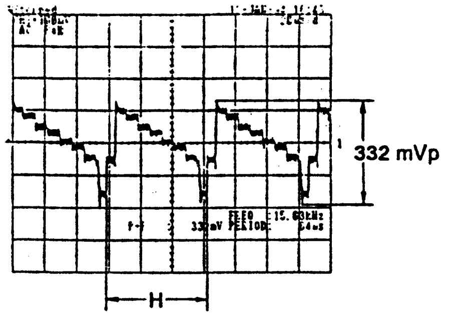
⓫ IC001 ㉝ PB



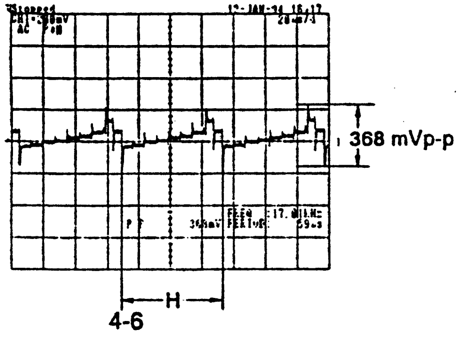
⓬ IC001 ㉜ REC



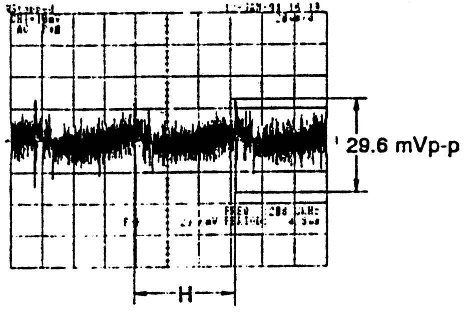
⓬ IC001 ㉜ PB



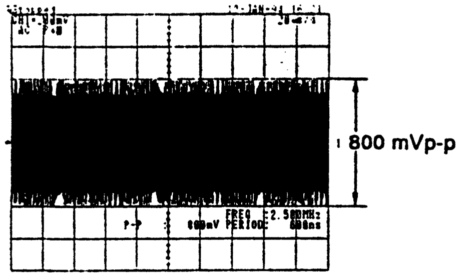
⓭ IC001 ㊺ REC



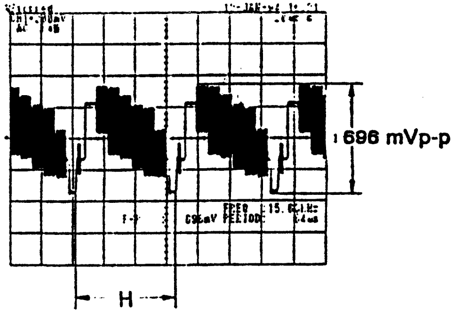
⓮ IC001 ㊼ REC



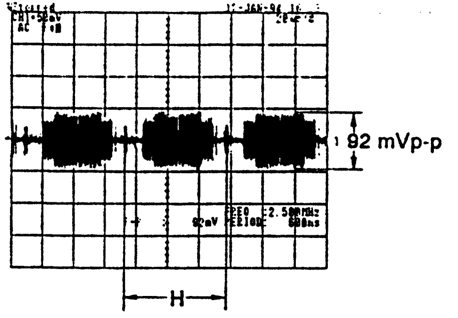
⓯ IC001 ㊿ REC 20 μsec/DIV



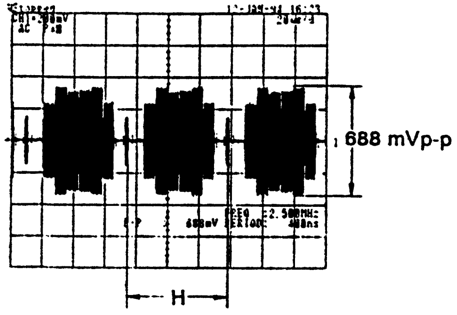
⓰ IC001 ⑳ REC



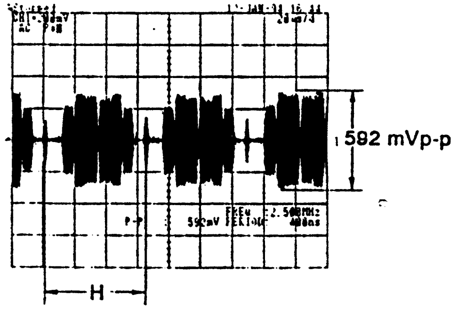
⓱ IC001 ⑱ REC



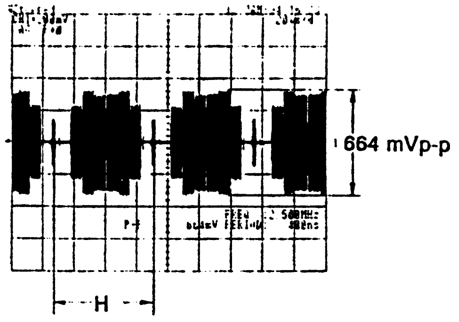
⓲ IC001 ⑯ REC



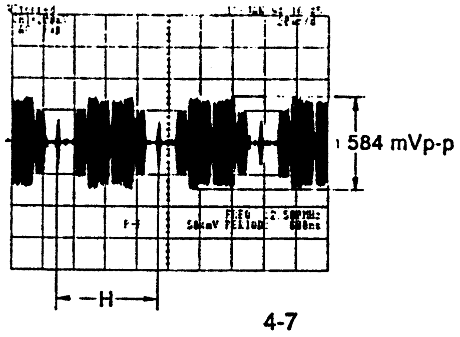
⓲ IC001 ⑯ PB



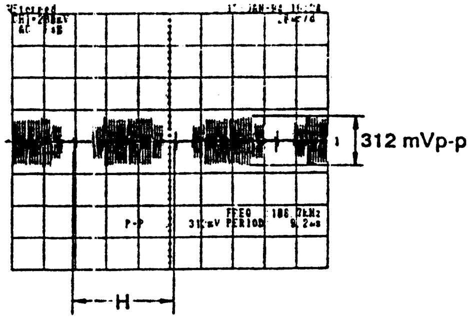
⓳ IC001 ⑭ REC



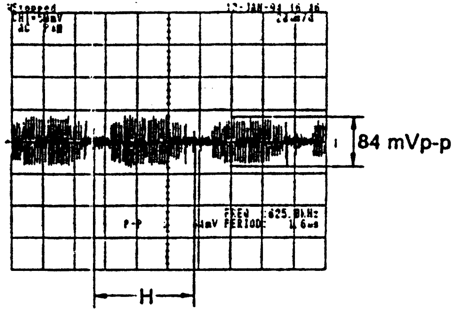
⓳ IC001 ⑭ PB



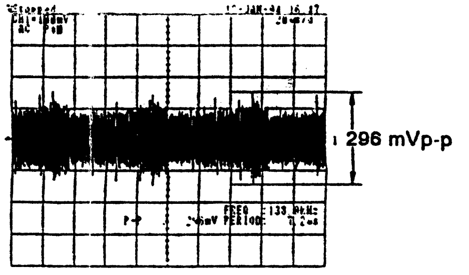
⓴ IC001 (53) REC



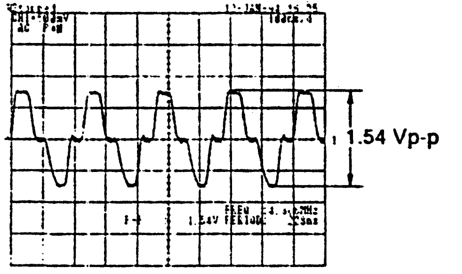
㉑ IC001 (51) PB



㉒ IC001 ㊸ PB

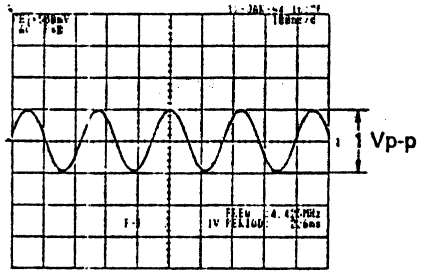


㉓ IC001 ⑥ REC/PB

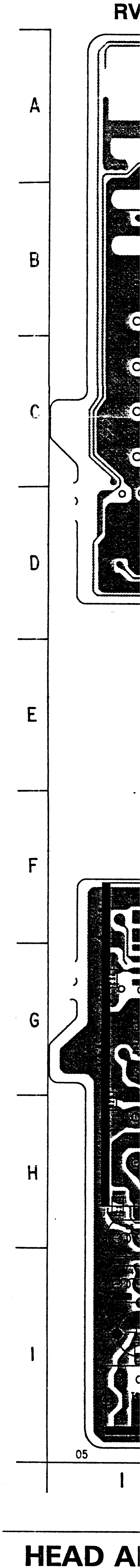


4.43 MHz

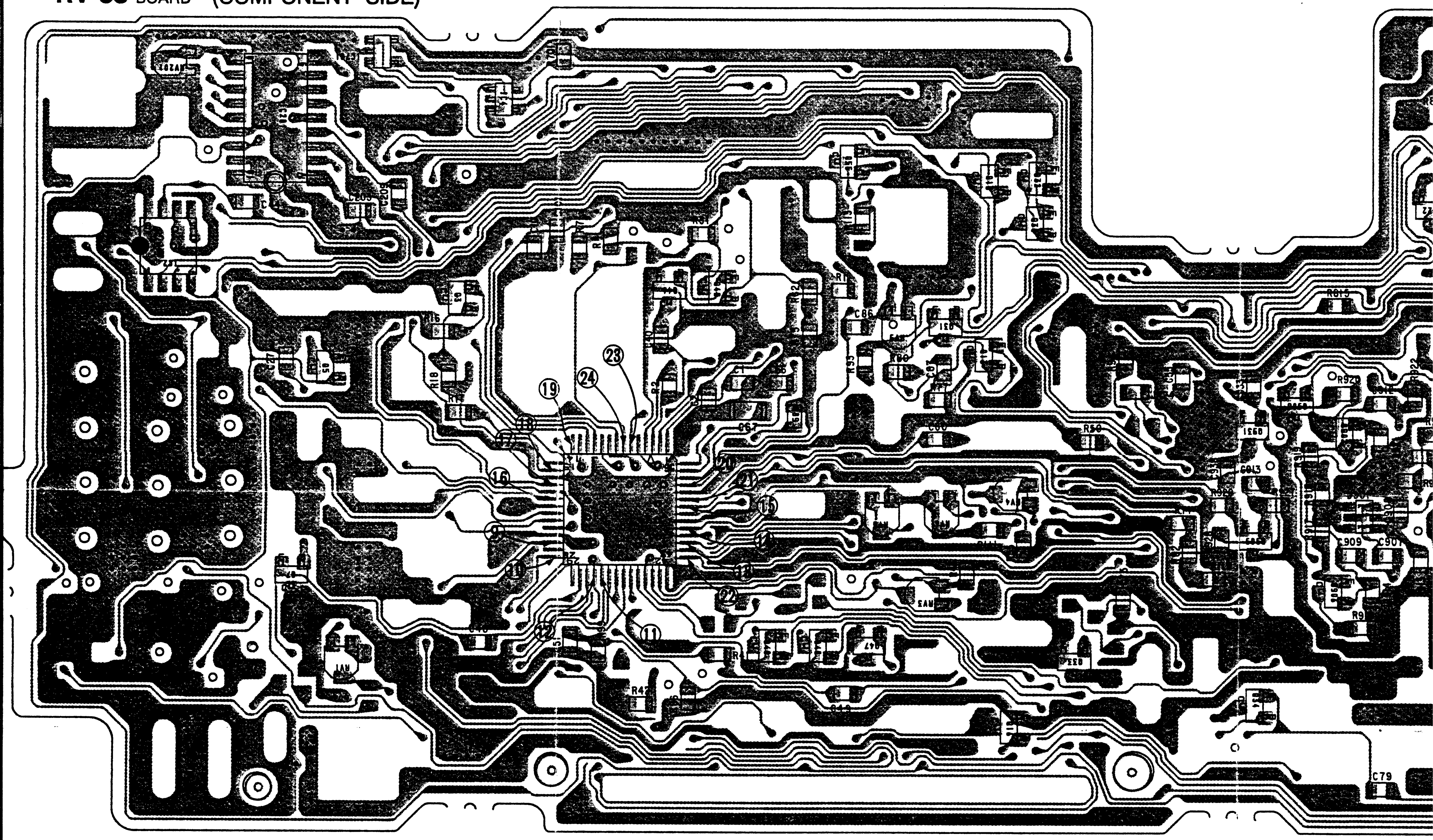
㉔ IC001 ⑦ REC/PB



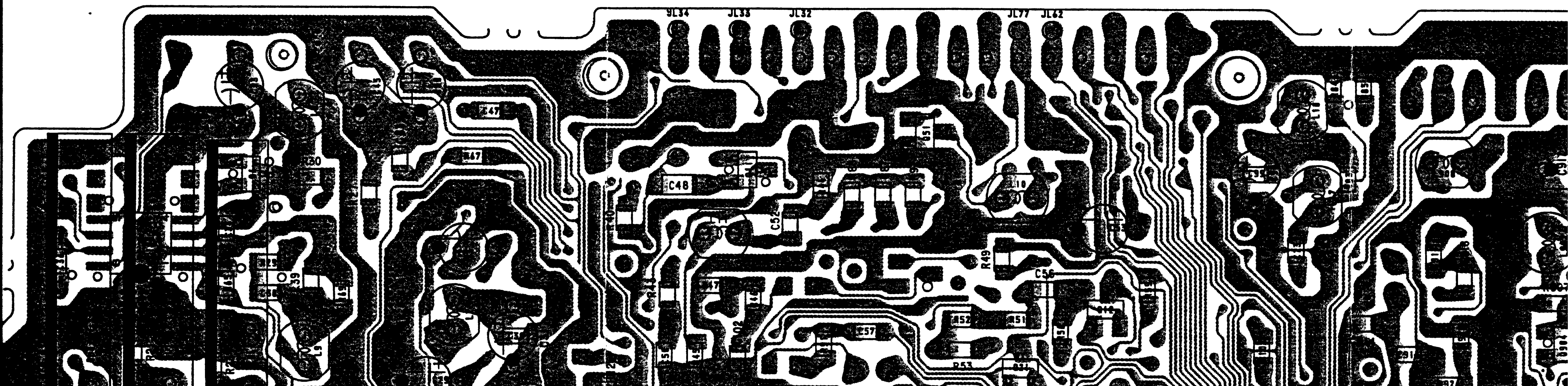
4.43 MHz



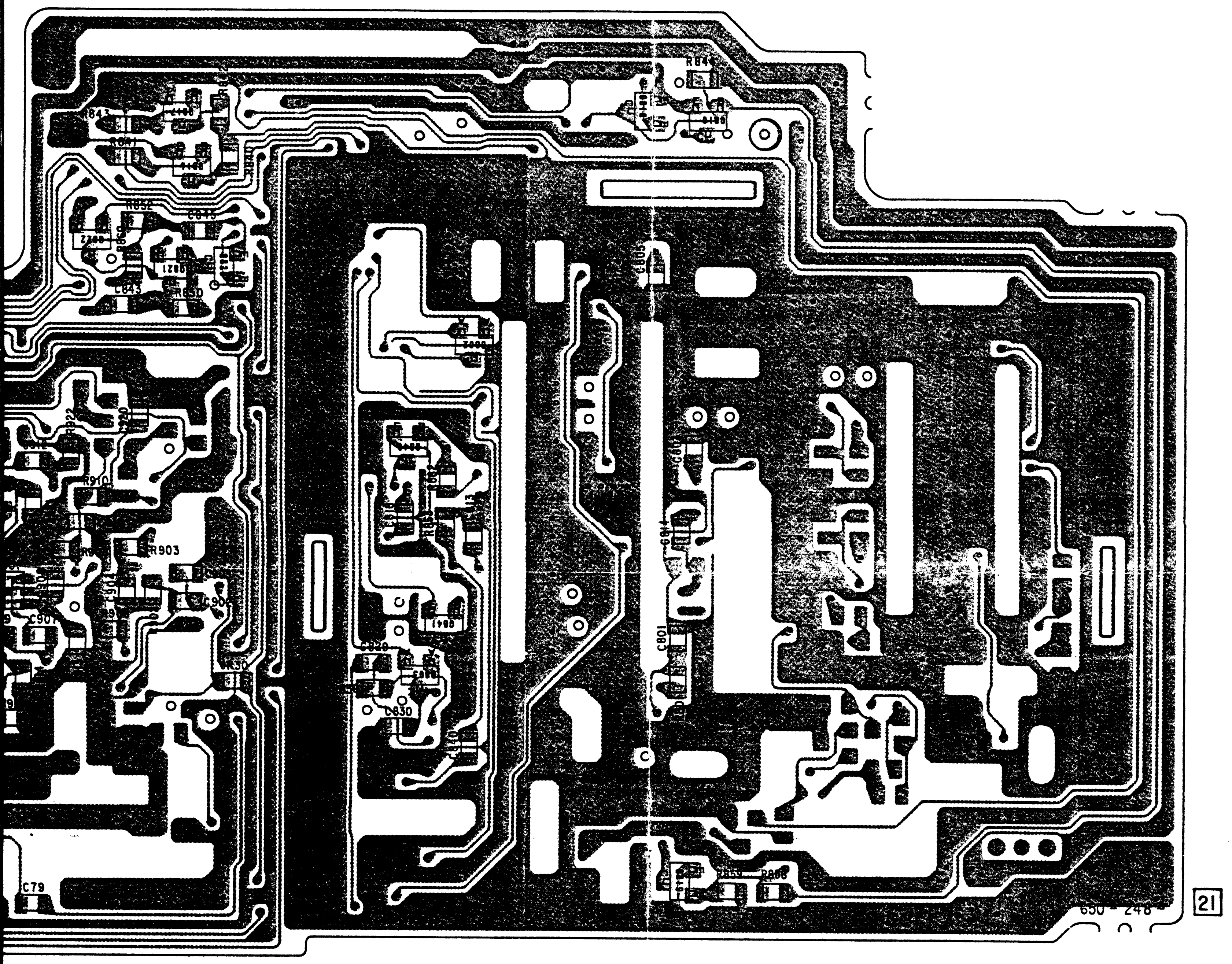
RV-33 BOARD (COMPONENT SIDE)

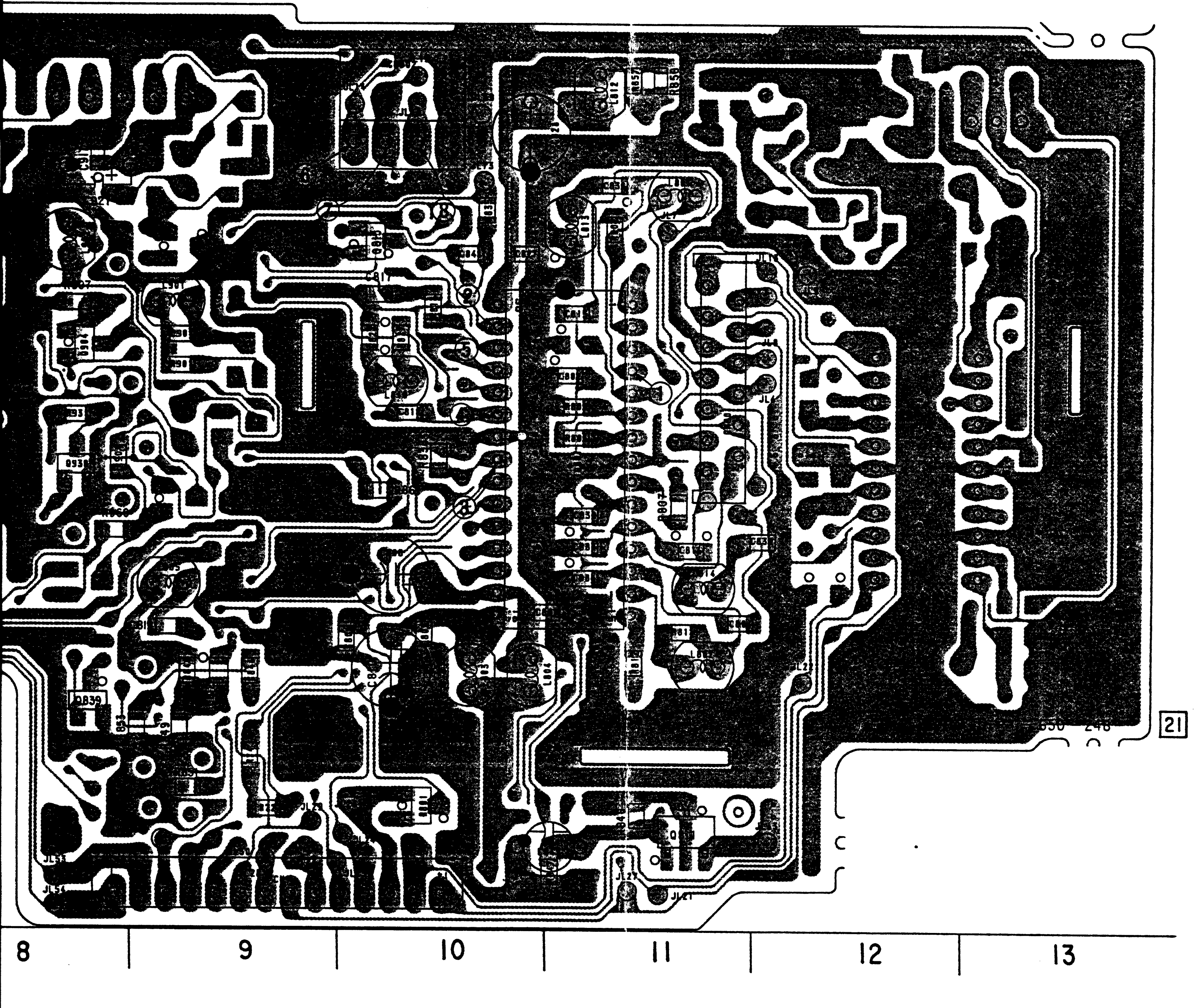

⑲
㉔
㉓
⑯
⑮
⑭
⑬
⑫
⑪
⑳
㉑
㉒
R16
R56
R42
R813
R920
C86
C67
C909
C907
C79
IC60
C613

RV-33 BOARD (CONDUCTOR SIDE)


JL34
JL33
JL32
JL77
JL62
C48
R47
R49
C56
R3
CF201
R208
T1
Q41
R24
R57
JL53
05
1
2
3
4
5
6
7
8

AD AMP, VIDEO



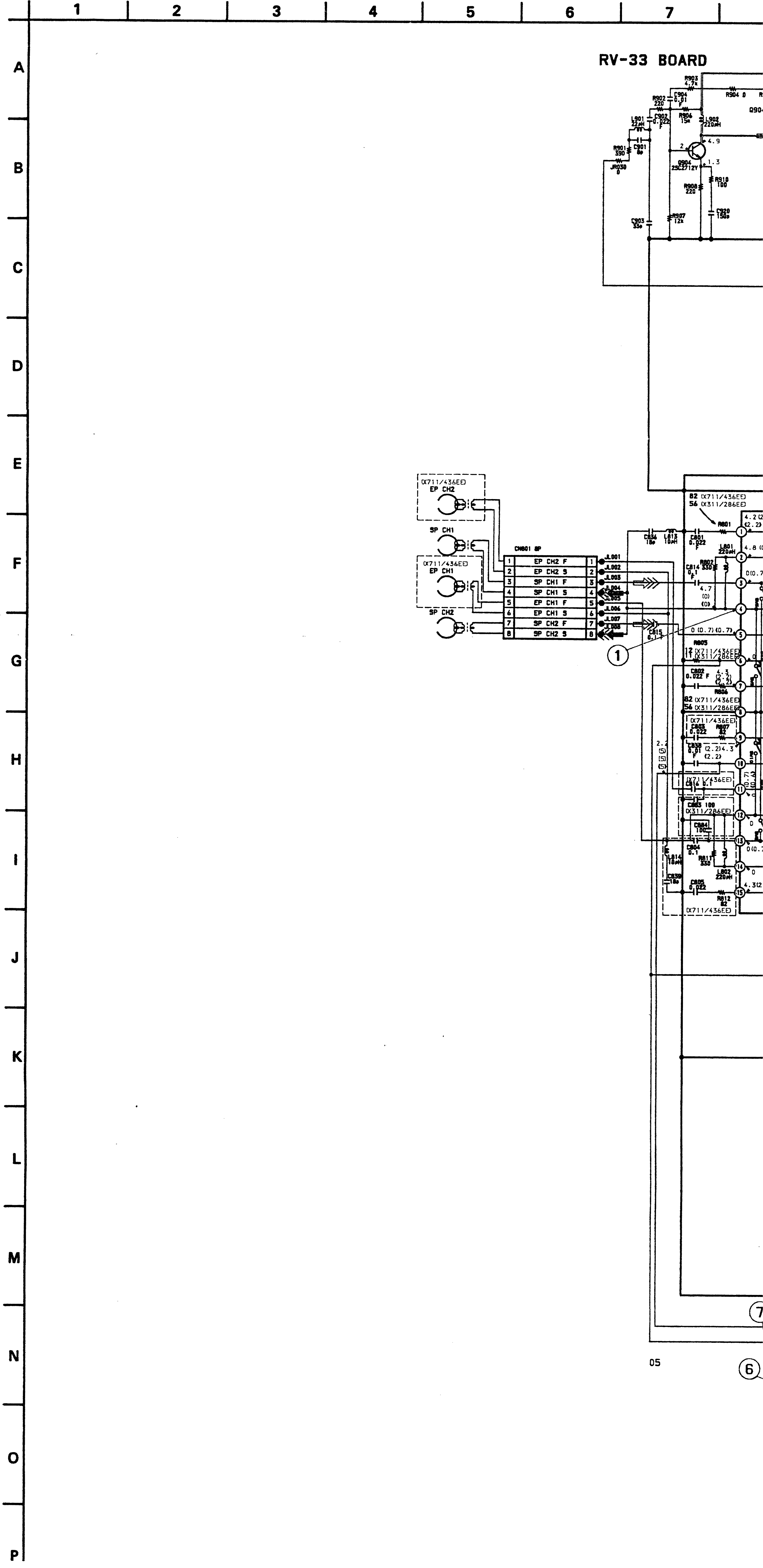


RV-33 BOARD

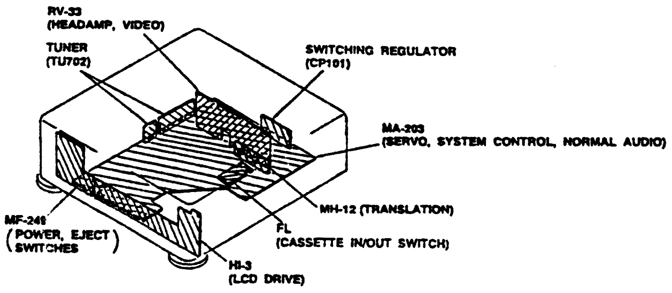
CN001	I-9
CN002	I-5
CN801	G-11
CN802	F-10
D001	I-3
D801	I-10
D802	B-10
D803	D-10
D901	C-8
IC001	C-4
IC002	B-2
IC003	G-1
IC004	A-3
IC201	A-2
IC701	A-3
IC801	H-11
Q001	I-4
Q002	I-4
Q003	B-3
Q004	H-2
Q005	B-2
Q006	F-2
Q007	C-2
Q011	F-4
Q012	G-6
Q013	B-6
Q014	H-5
Q016	D-6
Q018	A-6
Q021	G-6
Q027	I-2
Q028	H-5
Q029	H-6
Q030	B-6
Q031	B-6
Q032	A-6
Q033	D-6
Q034	D-7
Q040	D-5
Q041	I-5
Q046	B-4
Q047	D-5
Q048	D-5
Q049	B-4
Q051	F-5
Q055	A-5
Q201	I-2
Q810	A-11
Q811	I-11
Q815	G-10
Q816	A-9
Q817	A-9
Q818	A-11
Q819	D-11
Q820	B-9
Q821	B-9
Q822	B-8
Q839	I-8
Q840	B-10
Q841	C-10
Q904	G-8
Q906	D-8
Q907	C-8
Q908	C-8
Q909	C-7
Q931	C-7
Q938	H-8
Q939	H-8

RV-33 (HEADAMP, VIDEO) SCHEMATIC DIAGRAM

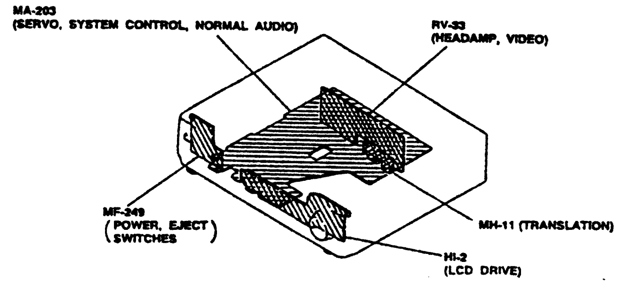
– Ref. No.: RV-33 Board; 1,000 series –


1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
RV-33 BOARD
R903 4.7k
R904 0
C904 0.01 F
R902 220
R906 15k
L902 220μH
L901 22μH
C902 0.022 F
R901 390
C901 8p
JR030 0
Q904 2SC2712Y
4.9
2
1.3
R908 220
R910 100
R907 12k
C903 33p
C920 150p
Q904
(X711/436EE) EP CH2
SP CH1
(X711/436EE) EP CH1
SP CH2
CN801 8P
EP CH2 F
EP CH2 S
SP CH1 F
SP CH1 S
EP CH1 F
EP CH1 S
SP CH2 F
SP CH2 S
JL001
JL002
JL003
JL004
JL005
JL006
JL007
JL008
82 (X711/436EE)
56 (X311/286EE)
R801
C836 18p
L813 10μH
C801 0.022 F
L801 220μH
R802 330
C814 0.1 F
C815 0.1 F
R805
12 (X711/436EE)
11 (X311/286EE)
C802 0.022 F
R806
C803 0.022
R807 82
C830 0.01 F
C863 100
C864 100
C804 0.1
R811 330
L802 220μH
L814 10μH
C839 18p
C805 0.022
R812 82
①
⑥
⑦
05

- **SLV-286EE/X311**


RV-33 (HEADAMP, VIDEO)
TUNER (TU702)
SWITCHING REGULATOR (CP101)
MA-203 (SERVO, SYSTEM CONTROL, NORMAL AUDIO)
MH-12 (TRANSLATION)
FL (CASSETTE IN/OUT SWITCH)
MF-249 (POWER, EJECT SWITCHES)
HI-3 (LCD DRIVE)

- **SLV-436EE/X711**

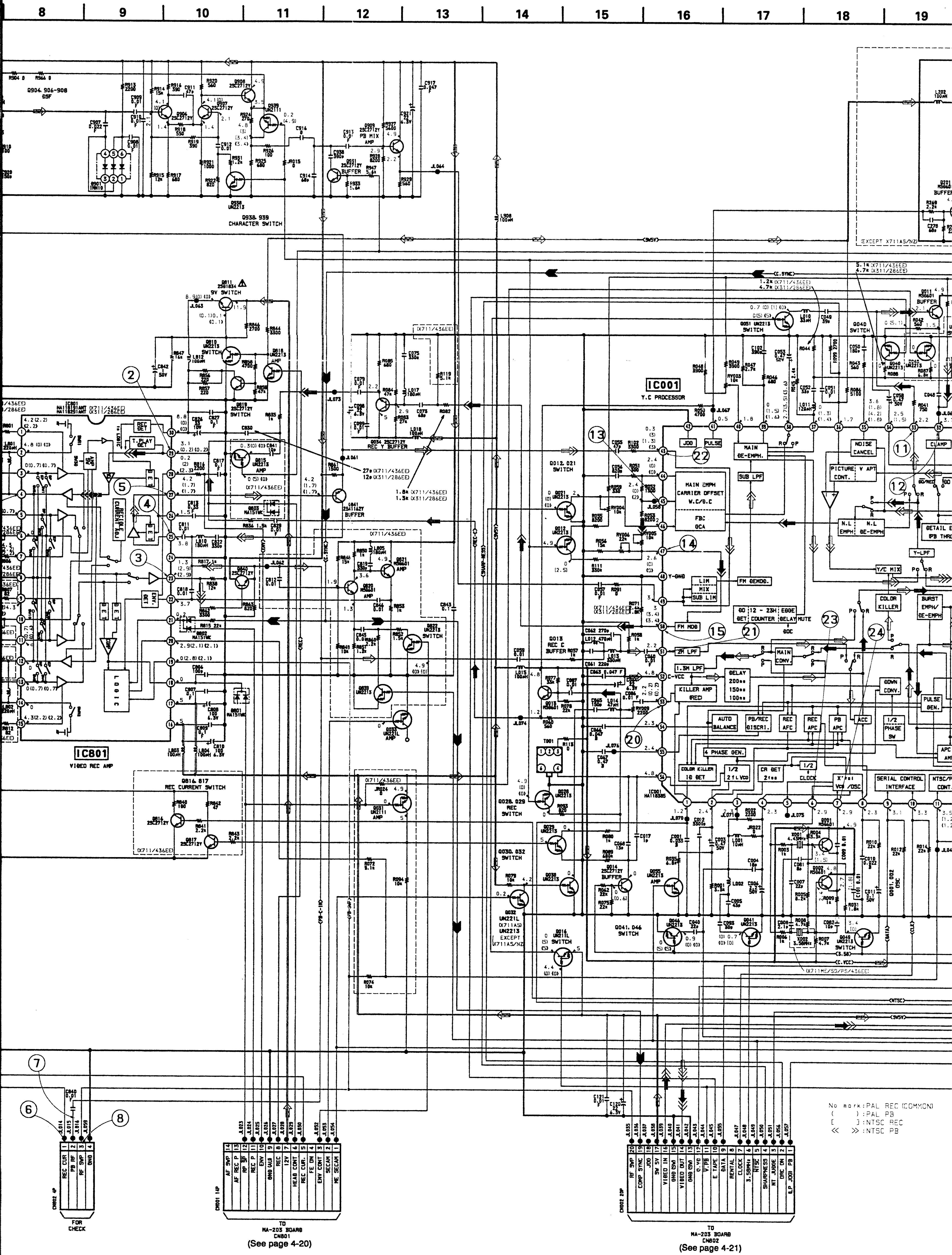

MA-203 (SERVO, SYSTEM CONTROL, NORMAL AUDIO)
RV-33 (HEADAMP, VIDEO)
MF-249 (POWER, EJECT SWITCHES)
MH-11 (TRANSLATION)
HI-2 (LCD DRIVE)

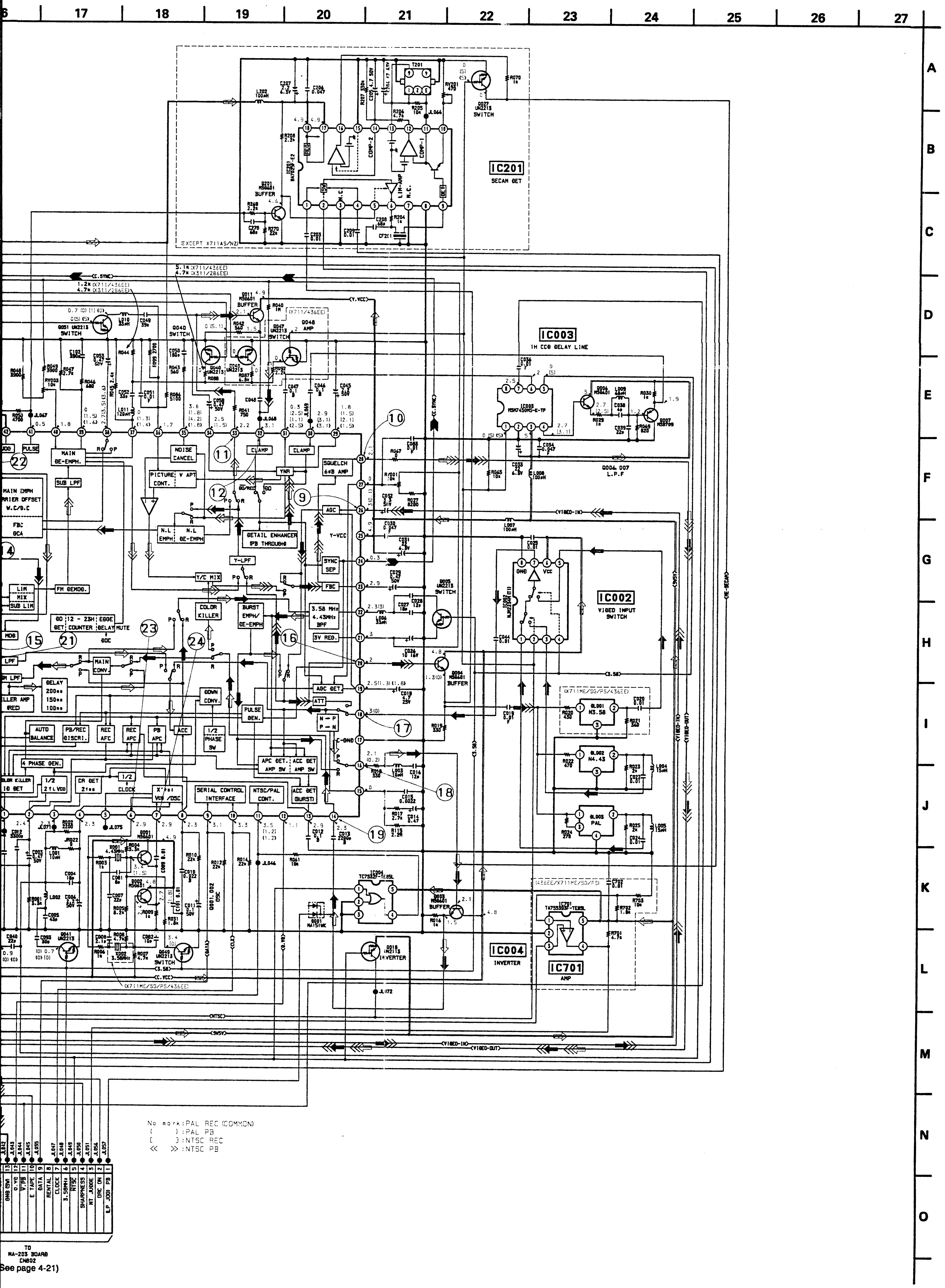
- Signal path

	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC	➡	➡》	➡》》
PB	⇨	⇨》	⇨》》

- Signal path

	REC
Ref. signal	➤


8
9
10
11
12
13
14
15
16
17
18
19
Q904, 906-908
05F
Q938, 939
CHARACTER SWITCH
Q909 2SC2712Y PB MIX AMP
Q931 2SC2712Y BUFFER
EXCEPT X711AS/NZ
Q811 2SB1834 9V SWITCH
Q810 UN2213 SWITCH
Q818 UN2213 AMP
Q819 2SC2712Y SWITCH
Q815 UN2213 AMP
Q834 2SC2712Y REC Y BUFFER
Q841 2SA1162Y BUFFER
Q820 RN2601 AMP
Q821 RN2601 AMP
Q822 UN2213 SWITCH
Q839 UN2213
Q833 UN221L AMP
Q831 UN2111 AMP
IC801 VIDEO REC AMP
IC801 MA18191AHT (X711/436EE) MA18251AHT (X311/286EE)
REC DET
T.PLAY DET
CURRENT ADJ
ENV. DET
LOGIC
Q816, 817 REC CURRENT SWITCH
IC001 Y.C PROCESSOR
IC001 HA118385
JOG
PULSE
MAIN DE-EMPH.
NOISE CANCEL
CLAMP
PICTURE V APT CONT.
MAIN EMPH CARRIER OFFSET W.C/D.C
FBC
OCA
SUB LPF
N.L EMPH
N.L DE-EMPH
DETAIL E PB THRO
Y-LPF
Y/C MIX
LIM MIX SUB LIM
FM DEMOD.
FM MOD
60 12 - 23H DET COUNTER
EDGE DELAY MUTE
COLOR KILLER
BURST EMPH/ DE-EMPH
2M LPF
MAIN CONV.
1.3M LPF
DELAY 200ns 150ns 100ns
KILLER AMP (REC)
AUTO BALANCE
PB/REC DISCRI.
REC AFC
REC APC
PB APC
ACC
1/2 PHASE SW
DOWN CONV.
PULSE GEN.
APC AMP
4 PHASE GEN.
COLOR KILLER ID DET
1/2 2fL VCO
CR DET 2fsc
1/2 CLOCK
X'tal VCO /OSC
SERIAL CONTROL INTERFACE
NTSC/P CONT.
Q051 UN2213 SWITCH
Q040 SWITCH
Q011 RN5601 BUFFER
Q201 RN5601 BUFFER
Q012, 021 SWITCH
Q013 REC C BUFFER
Q028, 029 REC SWITCH
Q030, 032 SWITCH
Q032 UN221L (X711AS) UN2213 EXCEPT X711AS/NZ
Q016 UN211L SWITCH
Q014 2SC2712Y BUFFER
Q055 UN2213 AMP
Q041, 046 SWITCH
Q049 UN2213 SWITCH
Q001, 002 OSC
(X711ME/SG/PS/436EE)
(SW5V)
(C.SYNC)
(NTSC)
No mark : PAL REC (COMMON)
( ) : PAL PB
[ ] : NTSC REC
≪ ≫ : NTSC PB
CN802 4P
REC CUR
PB RF
RF SWP
GND
FOR CHECK
CN001 14P
AF SWP
AF REC P
RP SW
REC P
ENV
GND (AU)
REC
12V
HEAD CONT
REC CUR.
FE ON
ENV CONT
SECAM
ME SECAM
TO MA-203 BOARD CN801
(See page 4-20)
CN002 20P
RF SWP
COMP SYNC
JOG
SW 5V
VIDEO IN
GND (SW)
VIDEO OUT
GND (SW)
Q.VC
V.PB
E TAPE
DATA
RENTAL
CLOCK
3.58MHz
NTSC
SHARPNESS
NT JUDGE
DRC ON
(LP JOG) PB
TO MA-203 BOARD CN802
(See page 4-21)

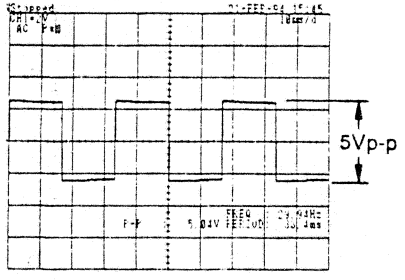

IC201
SECAM DET
(EXCEPT X711AS/NZ)
IC003
1H CCD DELAY LINE
MSM7450MS-K-TP
IC002
VIDEO INPUT SWITCH
IC004
INVERTER
TC7S32F-TE85L
IC701
AMP
TA75S393F-TE85L
Q027 UN2213 SWITCH
Q201 M56601 BUFFER
Q011 M56601 BUFFER
Q048 AMP
Q051 UN2213 SWITCH
Q040 SWITCH
Q047 UN2213 SWITCH
Q005 UN2213 SWITCH
Q004 M56601 BUFFER
Q003 M56601 BUFFER
Q018 UN2213 INVERTER
Q006, Q07 L.P.F
MAIN DE-EMPH.
NOISE CANCEL
CLAMP
YNR
SQUELCH 6dB AMP
PICTURE V APT CONT.
DETAIL ENHANCER PB THROUGH
AGC
Y-VCC
SYNC SEP
Y-LPF
Y/C MIX
FBC
COLOR KILLER
BURST EMPH/ DE-EMPH
3.58 MHz 4.43MHz BPF
5V REG.
MAIN CONV.
DOWN CONV.
PULSE GEN.
AGC DET
ATT
N→P P→N
C-GND
APC DET AMP SW
ACC DET AMP SW
ACC DET (BURST)
SERIAL CONTROL INTERFACE
NTSC/PAL CONT.
X'tal VCO /OSC
1/2 CLOCK
CR DET 2fsc
1/2 2 1 L VCO
4 PHASE GEN.
AUTO BALANCE
PB/REC DISCRI.
REC AFC
REC APC
PB APC
ACC
1/2 PHASE SW
SUB LPF
MAIN EMPH CARRIER OFFSET W.C/D.C
FBC DCA
N.L EMPH
N.L DE-EMPH
LIM MIX SUB LIM
FM DEMOD.
DELAY 200ns 150ns 100ns
DO 12 - 23H DET COUNTER EDGE DELAY MUTE
(C.SYNC)
(Y.VCC)
(VIDEO-IN)
(VIDEO-OUT)
(NTSC)
(SWSV)
(C.VCC)
(3.58)
(DATA)
(CLK)
(X711ME/SG/PS/436EE)
(436EE/X711ME/SG/PS)
BL001 N3.58
BL002 N4.43
BL003 PAL
X001 4.43MHz
X002 3.58MHz
GND (SW)
C VC
V PB
E TAPE
DATA
RENTAL
CLOCK
3.58MHz
NTSC
SHARPNESS
NT JUDGE
DRC ON
LP JOG PB
TO MA-203 BOARD CN602
(See page 4-21)

No mark : PAL REC (COMMON)
( ) : PAL PB
[ ] : NTSC REC
《 》 : NTSC PB

HEAD AMP, VIDEO

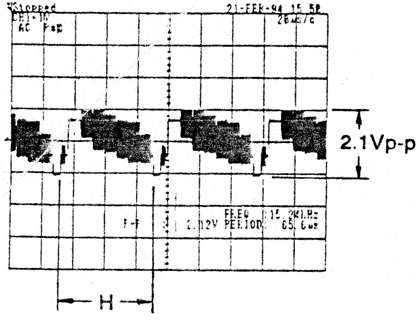
MA-203 Board NTSC 3.58 MODE

❶ IC501 ① REC/PB

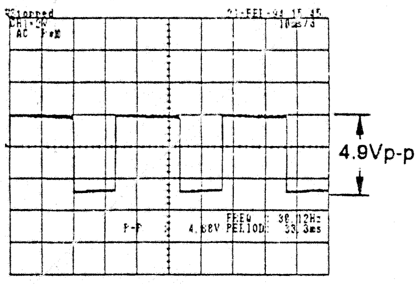


30Hz

❿ IC601 ⑯, ⑱ REC/PB

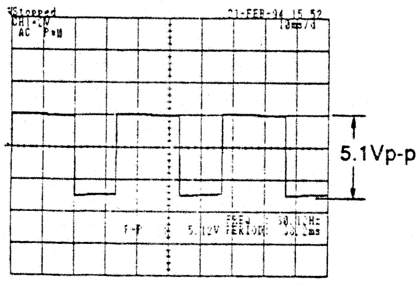


❷ IC501 ⑦ REC



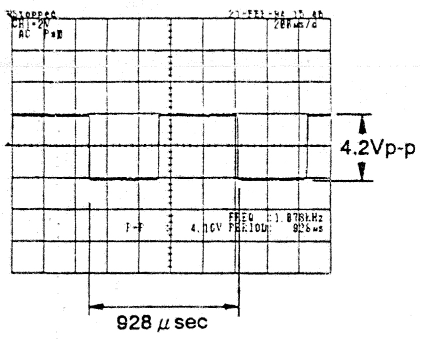
30Hz

⓭ IC501 (67) PB

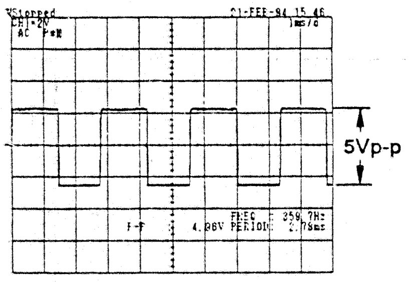


30Hz

❸ IC501 (70) REC/PB

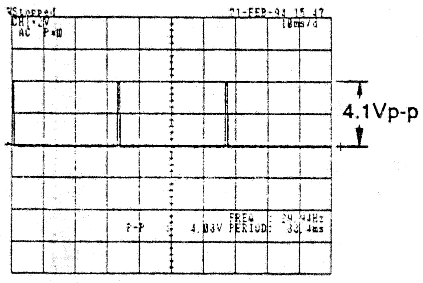


❹ IC501 (69) REC/PB



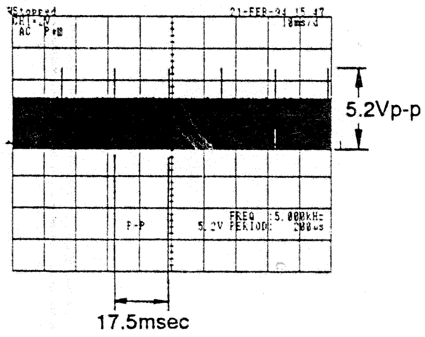
360Hz

❺ IC501 (68) REC/PB

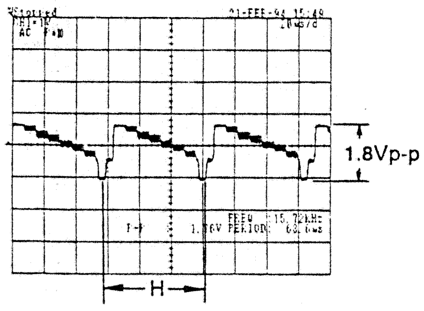


30Hz

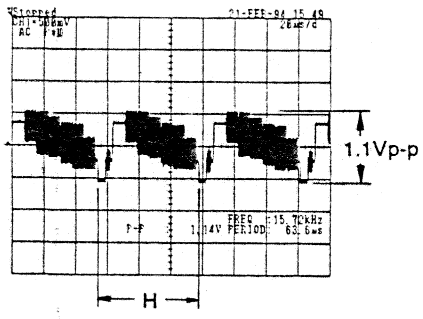
❻ IC501 (66) REC/PB



❽ IC601 ⑳ REC/PB

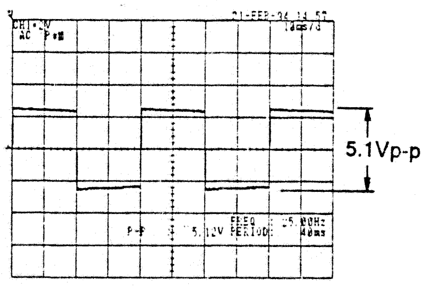


❾ IC801 ⑧ REC



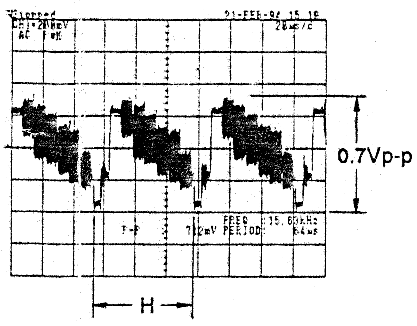
MA-203 Board PAL MODE

❶ IC501 ① REC/PB

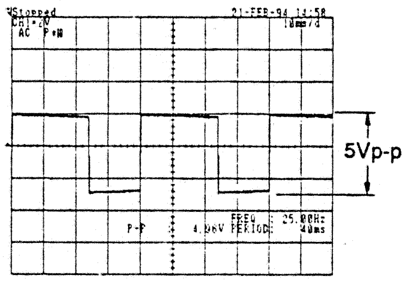


25Hz

❾ IC801 ⑧ REC

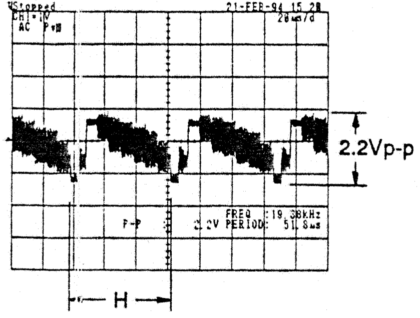


❷ IC501 ⑦ REC

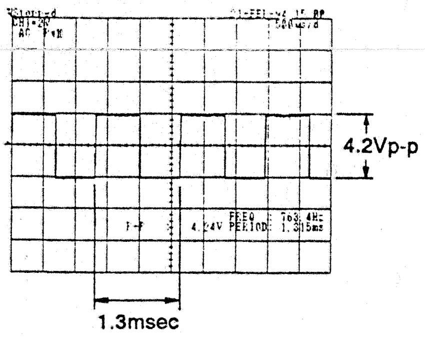


25Hz

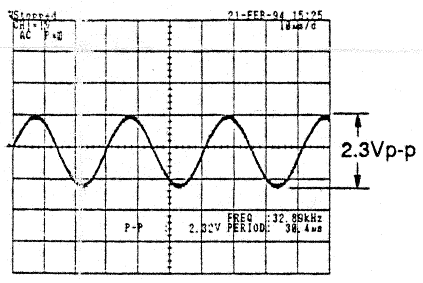
❿ IC601 ⑯, ⑱ REC/PB



❸ IC501 (70) REC/PB

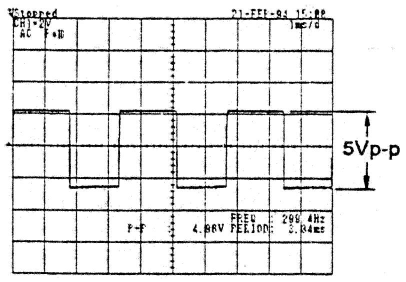


⓫ IC501 (66) REC/PB



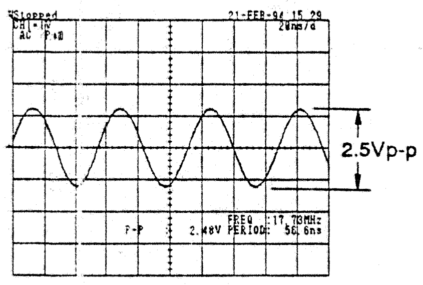
32.768kHz

❹ IC501 (69) REC/PB



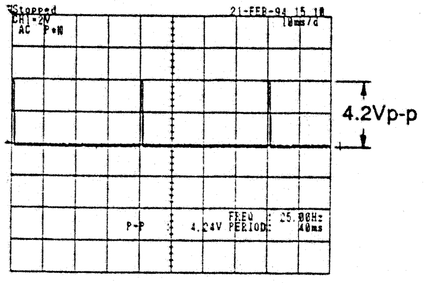
300Hz

⓬ IC601 ⑤ REC/PB



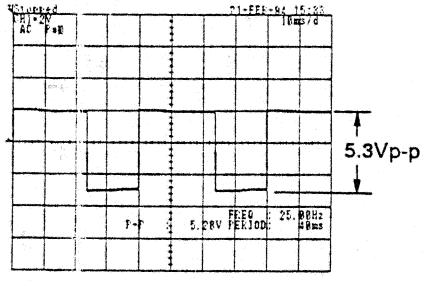
17.73MHz

❺ IC501 (68) REC/PB



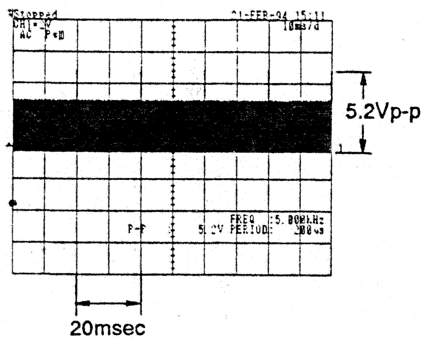
25Hz

⓭ IC501 (67) PB

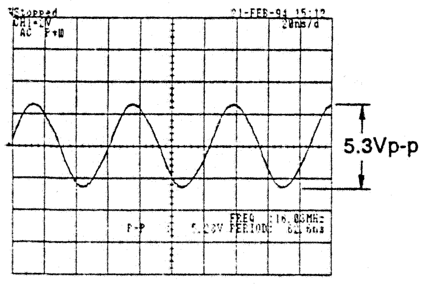


25Hz

❻ IC501 (65) REC/PB

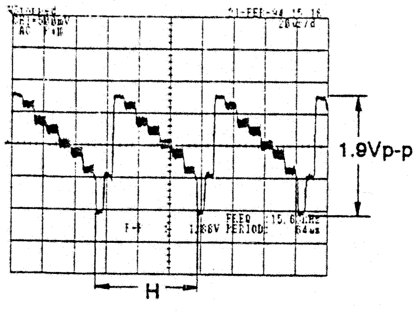


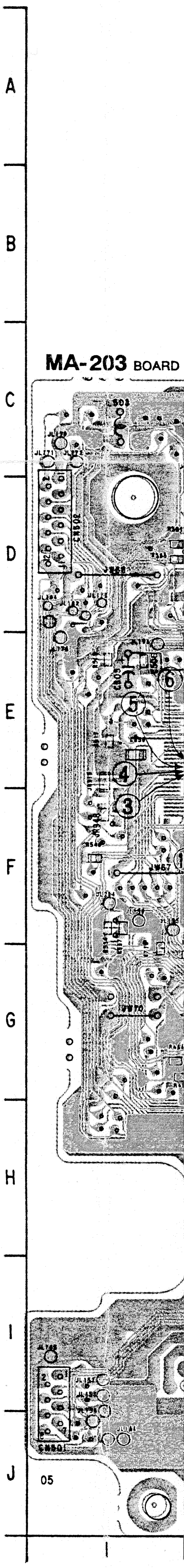
❼ IC501 ㊷ REC/PB



16MHz

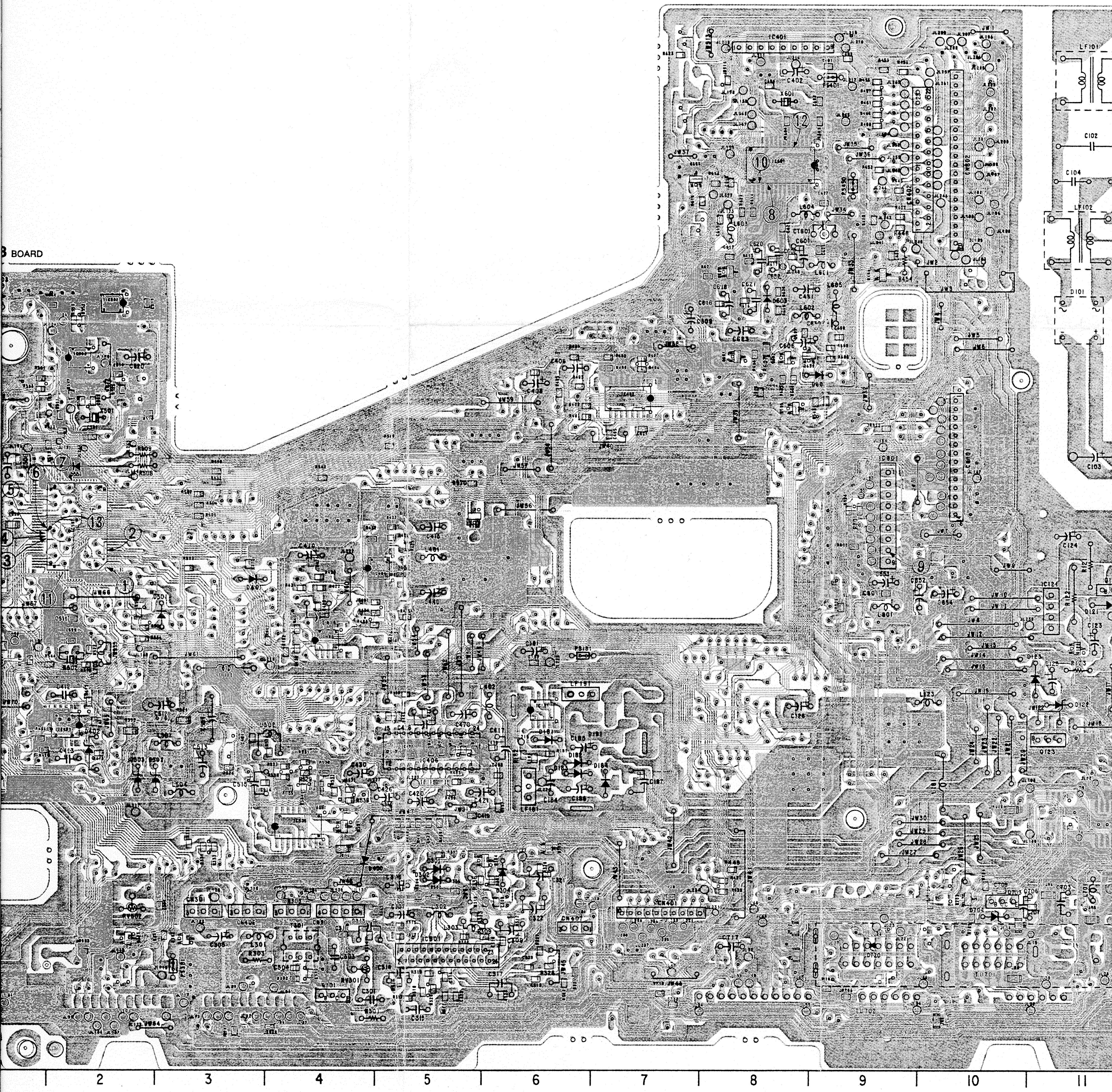
❽ IC601 ⑳ REC/PB



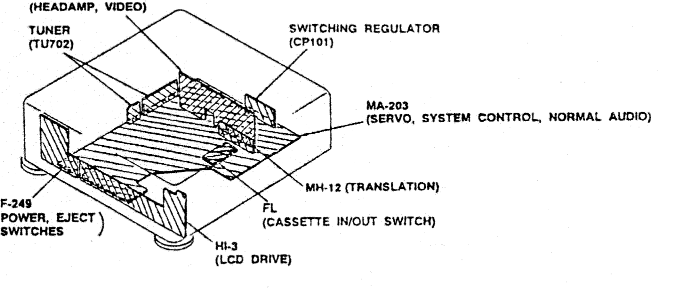


O, SYSTEM CONTROL, NORMAL AUDIO), MH-11/12 (TRANSLATION) PRINTED WIRING BOARDS

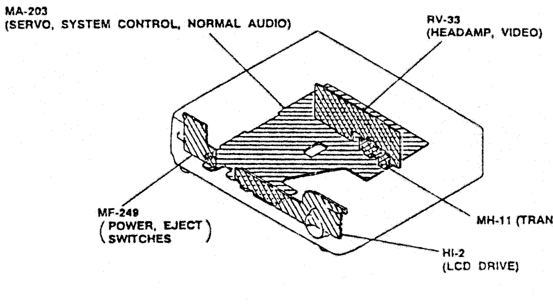
-203 Board; 2,000 series, MH-11/12 Board; 1,000 series –

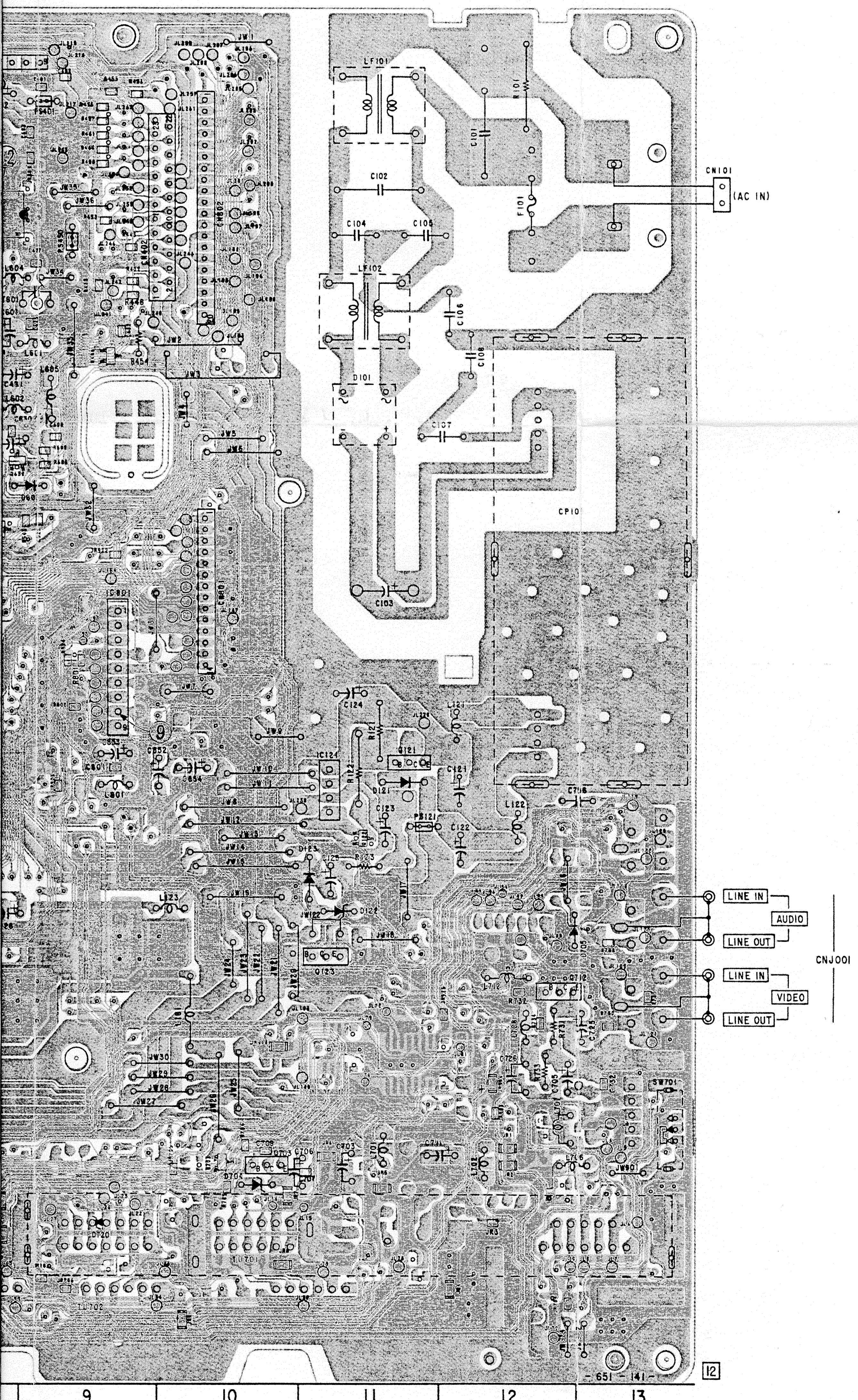

B BOARD
IC401
X601
C402
L604
CT601
L602
CN401
CN407
C317
R328
D720
TU701
TU702
LF101
LF102
C102
C104
D101
C103
IC124
D121
D122
Q123
IC801
2
3
4
5
6
7
8
9
10
11

• SLV-286EE/X311


RV-33
(HEADAMP, VIDEO)
TUNER
(TU702)
SWITCHING REGULATOR
(CP101)
MA-203
(SERVO, SYSTEM CONTROL, NORMAL AUDIO)
MH-12 (TRANSLATION)
FL
(CASSETTE IN/OUT SWITCH)
MF-249
(POWER, EJECT SWITCHES)
HI-3
(LCD DRIVE)

• SLV-436EE/X711


MA-203
(SERVO, SYSTEM CONTROL, NORMAL AUDIO)
RV-33
(HEADAMP, VIDEO)
MF-249
(POWER, EJECT SWITCHES)
MH-11 (TRAN
HI-2
(LCD DRIVE)

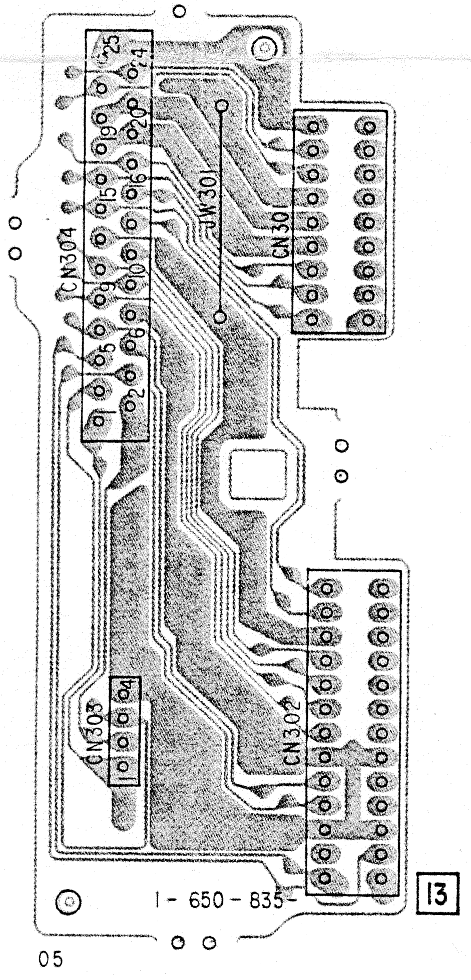

CN101
(AC IN)
LF101
LF102
C101
C102
C103
C104
C105
C106
C107
C108
R101
F101
D101
CP101
IC121
Q121
Q123
D121
D122
D123
L121
L122
C121
C122
C123
C124
LINE IN
AUDIO
LINE OUT
LINE IN
VIDEO
LINE OUT
CNJ001
9
10
11
12
13
651-141-
12

MA-203 BOARD

CN101	B-13
CN301	I-3
CN302	I-4
CN303	I-4
CN401	I-7
CN402	B-10
CN406	I-3
CN407	I-6
CN501	J-1
CN502	D-1
CN801	E-10
CN802	B-10
D101	C-11
D121	F-11
D122	G-11
D123	G-11
D181	G-6
D182	G-6
D183	G-6
D184	G-7
D301	H-5
D302	H-5
D303	
D304	H-6
D401	F-3
D402	G-2
D450	
D501	F-3
D502	H-3
D503	H-2
D551	
D601	D-8
D603	C-8
D703	I-10
D704	I-10
D705	G-12
D720	I-9
IC121	F-11
IC181	G-6
IC301	I-5
IC401	A-8
IC402	D-7
IC403	G-2
IC404	F-5
IC406	G-5
IC501	E-2
IC504	D-2
IC505	H-4
IC507	C-2
IC601	B-8
IC801	E-9
Q121	F-11
Q122	G-11
Q123	F-11
Q301	J-4
Q302	I-3
Q303	I-2
Q304	H-5
Q305	H-6
Q401	C-9
Q501	H-4
Q505	D-8
Q570	E-5
Q601	D-8
Q602	D-8
Q604	B-8
Q605	C-8
Q630	D-8
Q703	I-10
Q712	H-12

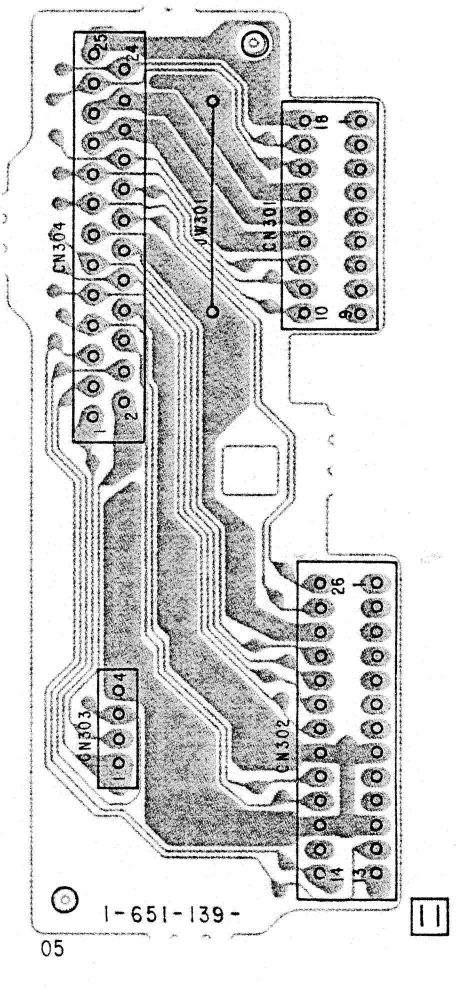
MH-11 BOARD

(SLV-X711/436EE)

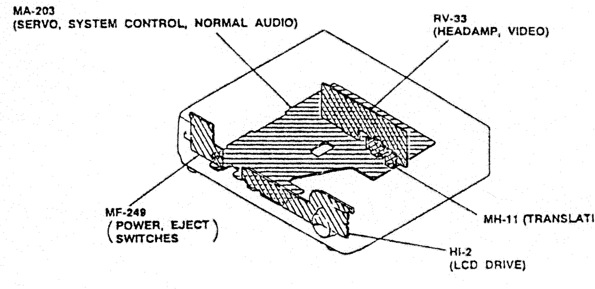

CN304
CN301
CN302
CN303
JW301
1-650-835-
05
13

MH-12 BOARD

(SLV-X311/286EE)

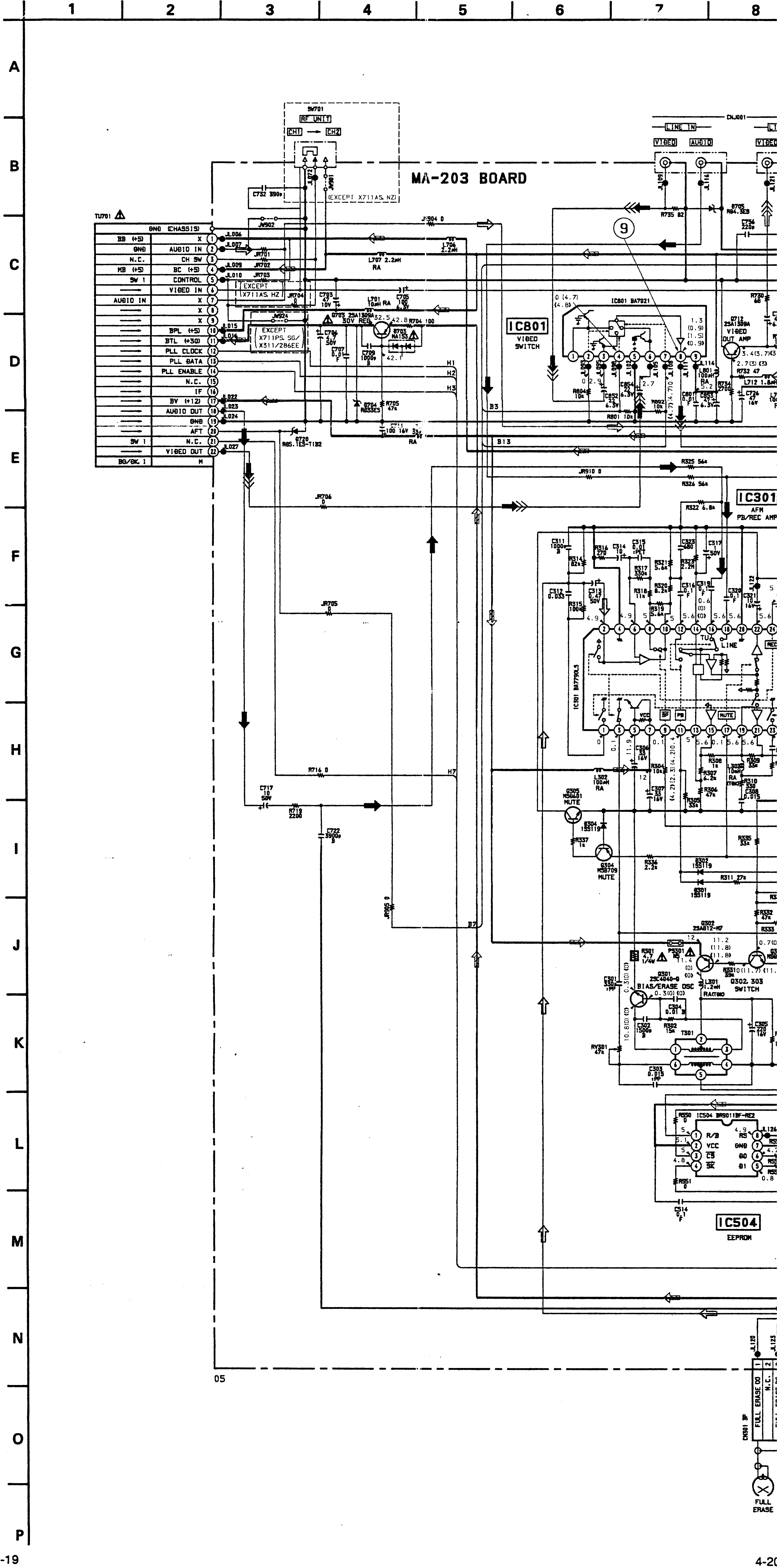

CN304
CN301
CN302
CN303
JW301
1-651-139-
05
11

• SLV-436EE/X711


MA-203
(SERVO, SYSTEM CONTROL, NORMAL AUDIO)
RV-33
(HEADAMP, VIDEO)
MF-249
(POWER, EJECT SWITCHES)
MH-11 (TRANSLATION)
HI-2
(LCD DRIVE)

MA-203 (SERVO, SYSTEM CONTROL, NORMAL AUDIO), MH-11/12 (TRANSLATION) SCHEMATIC DIAGRAM

– Ref. No.: MA-203 Board; 2,000 series, MH-11/12 Board; 1,000 series –



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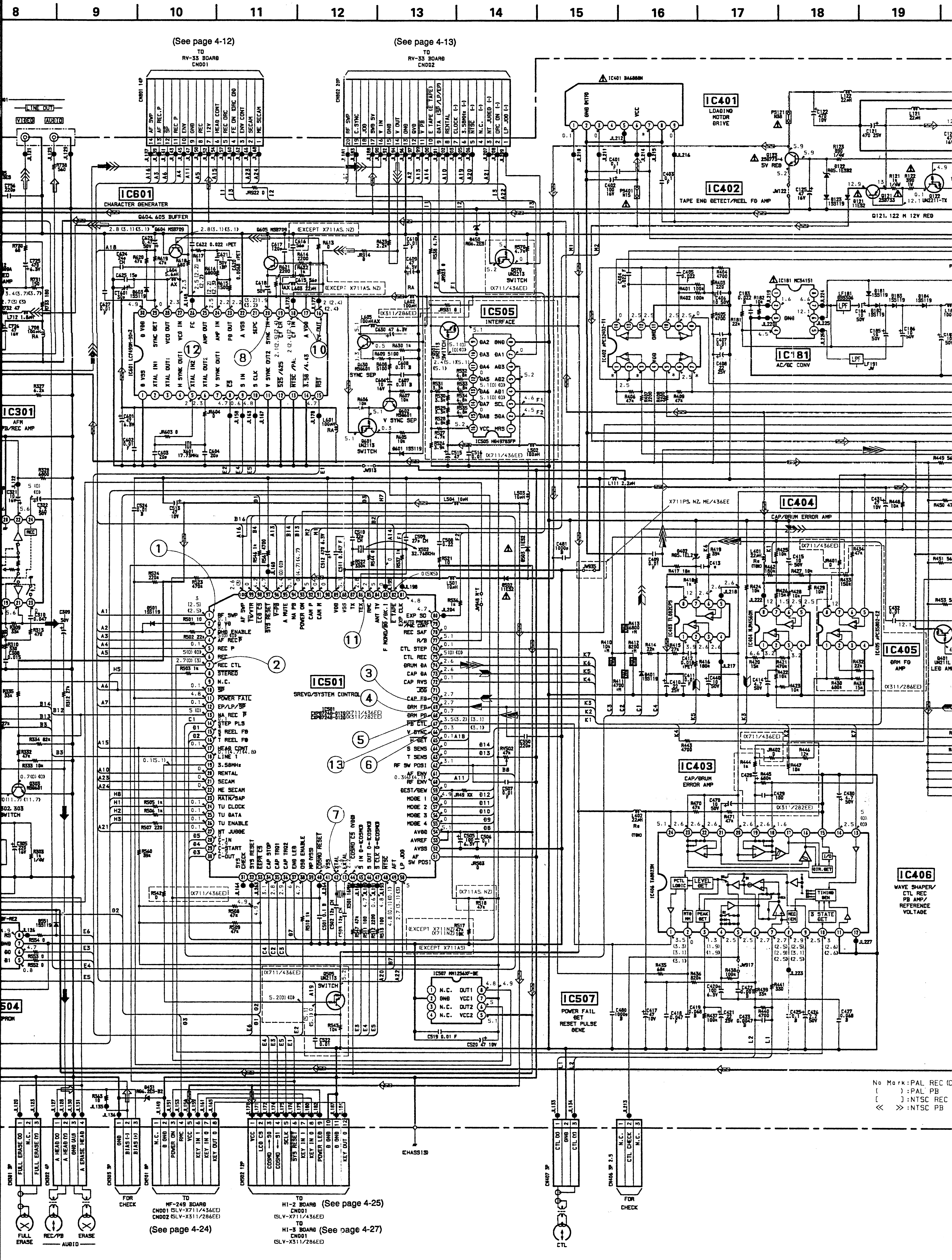
O
P
MA-203 BOARD
SW701
RF UNIT
CH1 → CH2
(EXCEPT X711AS, NZ)
TU701
GND (CHASSIS)
BB (+5)
GND
N.C.
MB (+5)
SW 1
AUDIO IN
X
AUDIO IN
CH SW
BC (+5)
CONTROL
VIDEO IN
BPL (+5)
BTL (+30)
PLL CLOCK
PLL DATA
PLL ENABLE
N.C.
IF
BV (+12)
AUDIO OUT
GND
AFT
N.C.
VIDEO OUT
BG/DK, I
EXCEPT X711AS, NZ
EXCEPT X711PS, SG/ X311/286EE
Q703 2SA1309A 30V REG
D703 MA153
D704 RD33ES
L707 2.2μH RA
L704 2.2μH
H1
H2
H3
H7
B3
B7
B13
LINE IN
VIDEO
AUDIO
CN J001
⑨
IC801 BA7021
IC801 VIDEO SWITCH
Q712 2SA1309A VIDEO OUT AMP
IC301 AFM PB/REC AMP
IC301 BA7795LS
TU
LINE
REC
SP
PB
VCC
MUTE
Q305 RN5401 MUTE
Q304 RN58709 MUTE
D304 1SS119
D302 1SS119
D301 1SS119
Q302 2SA812-M7
Q301 2SC4040-Q BIAS/ERASE OSC
Q302, 303 SWITCH
L301 1.2mH
T301
PS301
IC504 BR9011BF-RE2
R/B
VCC
CS
SK
RS
GND
DO
DI
IC504 EEPROM
CN501 3P
FULL ERASE DC
N.C.
FULL ERASE
05

- Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡>	➡>>	➡
PB	⇨	⇨>	⇨>>	⇨

- Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷>	
Drum servo (speed and phase)		▷>>	
Capstan speed servo		⊐	
Capstan phase servo	➤>	⊐>	⊐>
Capstan servo (speed and phase)		⊐>>	
Ref. signal	➤		⊐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19
(See page 4-12)
TO RV-33 BOARD CN001
(See page 4-13)
TO RV-33 BOARD CN002
IC601
CHARACTER GENERATER
Q604, 605 BUFFER
IC505
INTERFACE
IC501
SERVO/SYSTEM CONTROL
IC301
AFM PB/REC AMP
IC401
LOADING MOTOR DRIVE
IC402
TAPE END DETECT/REEL FG AMP
Q121, 122 M 12V REG
IC181
AC/DC CONV
IC404
CAP/DRUM ERROR AMP
IC405
DRM FG AMP
IC403
CAP/DRUM ERROR AMP
IC406
WAVE SHAPER/ CTL REC PB AMP/ REFERENCE VOLTAGE
IC507
POWER FAIL DET RESET PULSE GENE
LINE OUT
VIDEO
AUDIO
FULL ERASE
REC/PB
ERASE
AUDIO
FOR CHECK
TO MF-249 BOARD CN001 (SLV-X711/436EE) CN002 (SLV-X311/286EE)
(See page 4-24)
TO HI-2 BOARD (See page 4-25) CN001 (SLV-X711/436EE)
TO HI-3 BOARD (See page 4-27) CN001 (SLV-X311/286EE)
CHASSIS
CTL
FOR CHECK
504
PROM
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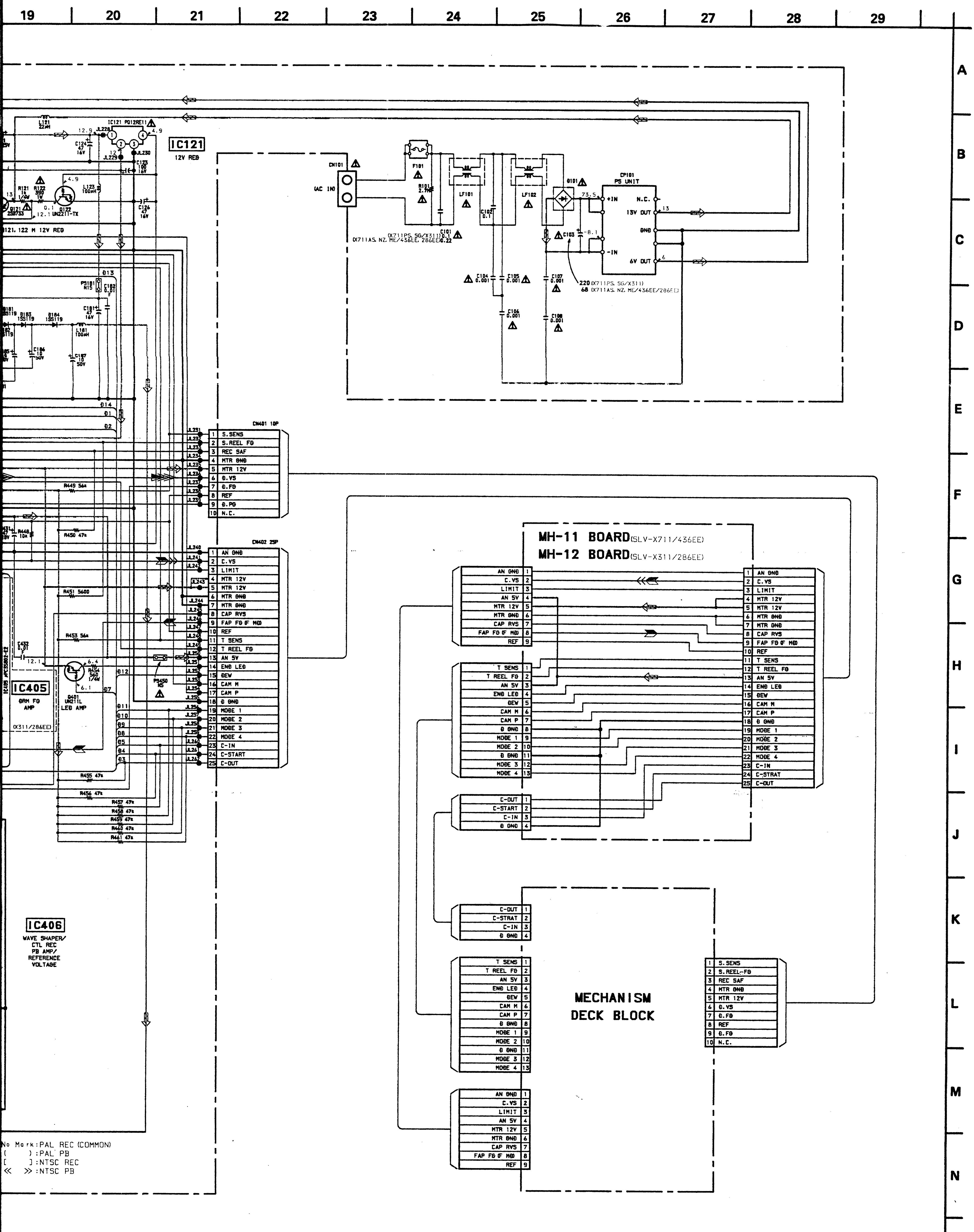
13

No Mark: PAL REC (
(   ): PAL PB
[   ]: NTSC REC
≪   ≫: NTSC PB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J
K
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M
N
O
IC121 PQ12RE11
IC121
12V REG
L121 22μH
C124 47 16V
C123 100 16V
C126 47 16V
L123 100μH
R121 1k 1/4W
R122 390 1W
Q121 2SD733
Q122 UN2211-TX
Q121, 122 M 12V REG
CN101
AC IN
F101
R101 2.7MΩ
LF101
LF102
C101 (X711PS, SG/X311)0.1 (X711AS, NZ, ME/436EE, 286EE)0.22
C102 0.1
D101
C103
220 (X711PS, SG/X311)
68 (X711AS, NZ, ME/436EE/286EE)
C104 0.001
C105 0.001
C106 0.001
C107 0.001
C108 0.001
CP101 PS UNIT
+IN
N.C.
13V OUT
GND
-IN
6V OUT
73.5
-8.1
13
6
D13
PS181 N15
C182 0.01
C181 47 16V
L181 100μH
D181 1SS119
D183 1SS119
D184 1SS119
C186 10 50V
C187 10 50V
D14
D1
D2
CN401 10P
1 S.SENS
2 S.REEL FG
3 REC SAF
4 MTR GND
5 MTR 12V
6 D.VS
7 D.FG
8 REF
9 D.PG
10 N.C.
CN402 25P
1 AN GND
2 C.VS
3 LIMIT
4 MTR 12V
5 MTR 12V
6 MTR GND
7 MTR GND
8 CAP RVS
9 FAP FG (F MD)
10 REF
11 T SENS
12 T REEL FG
13 AN 5V
14 END LED
15 DEW
16 CAM M
17 CAM P
18 D GND
19 MODE 1
20 MODE 2
21 MODE 3
22 MODE 4
23 C-IN
24 C-START
25 C-OUT
R449 56k
R450 47k
R448 10k
R451 5600
R453 56k
R454 560 1/4W
C432 0.01
Q401 UN211L LED AMP
IC405
IC405 GRM FG AMP
(X311/286EE)
PS450 N5
R455 47k
R456 47k
R457 47k
R458 47k
R459 47k
R460 47k
R461 47k
IC406
WAVE SHAPER/ CTL REC PB AMP/ REFERENCE VOLTAGE
MH-11 BOARD(SLV-X711/436EE)
MH-12 BOARD(SLV-X311/286EE)
MECHANISM DECK BLOCK
C-OUT
C-START
C-STRAT
C-IN
D GND
S.REEL-FG
No Mark: PAL REC (COMMON)
( ): PAL PB
[ ]: NTSC REC
« »: NTSC PB

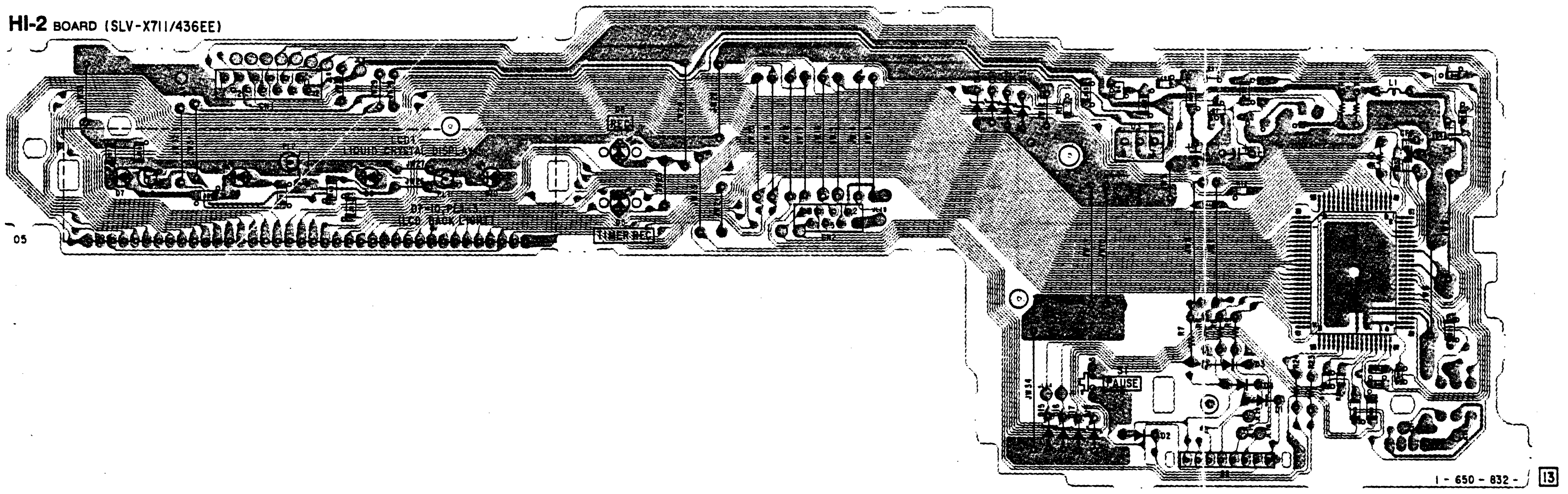
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SERVO, SYSTEM CONTROL

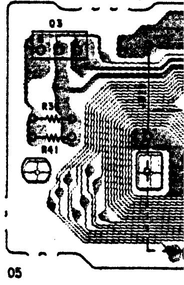
HI-2, HI-3 (LCD DRIVE), MF-249 (POWER, EJECT SWITCHES) SCHEMATIC DIAGRAM

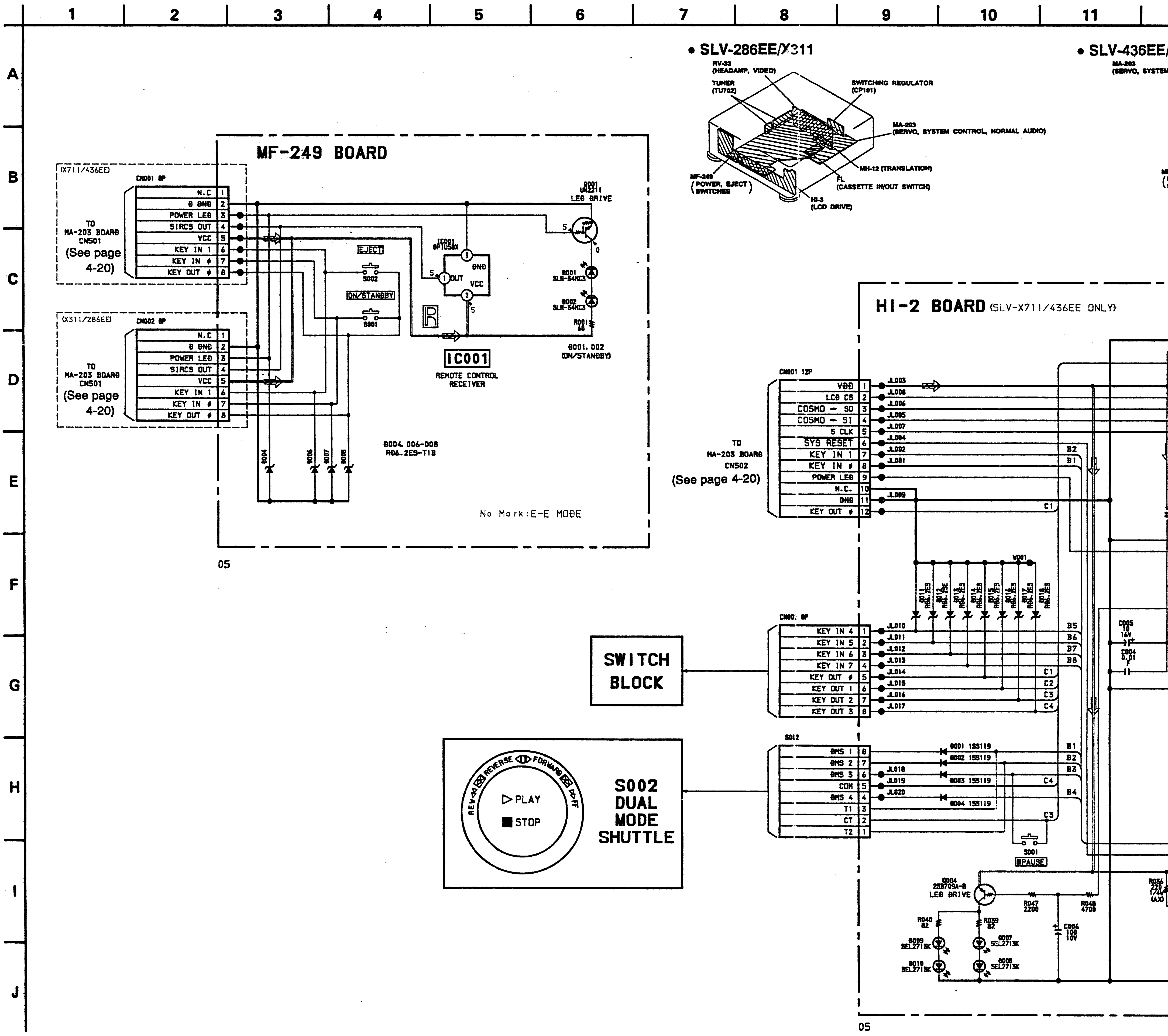
– Ref. No.: HI-2, HI-3, MF-249 Boards; 3,000 series –

HI-2 BOARD (SLV-X711/436EE)


05
LCD1
LIQUID CRYSTAL DISPLAY
D7-10,PL1-3
LCD BACK LIGHT
TIMER REC
REC
PAUSE
1-650-832-13

HI-3 BOARD (SLV-

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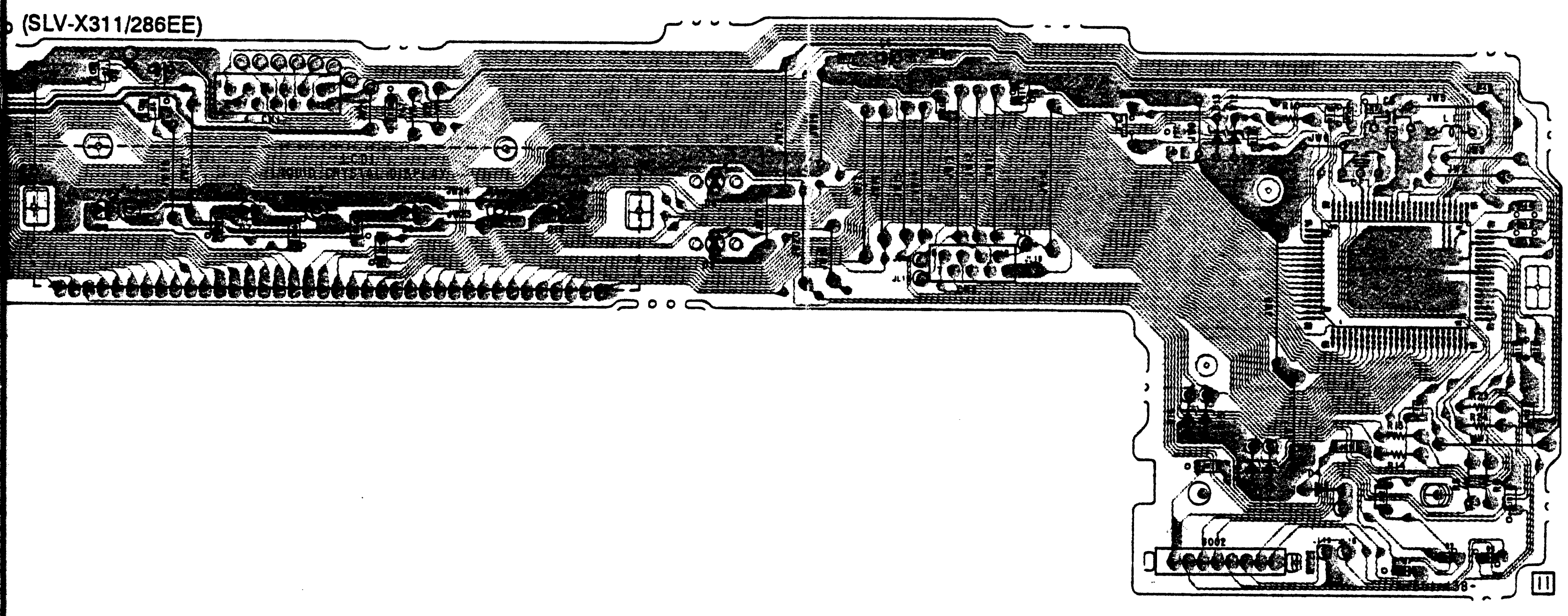
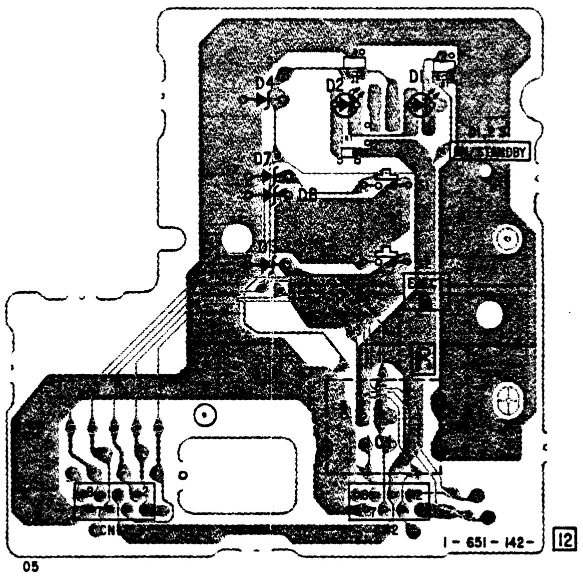
• SLV-286EE/X311
RV-33 (HEADAMP, VIDEO)
TUNER (TU702)
SWITCHING REGULATOR (CP101)
MA-203 (SERVO, SYSTEM CONTROL, NORMAL AUDIO)
MH-12 (TRANSLATION)
FL (CASSETTE IN/OUT SWITCH)
HI-3 (LCD DRIVE)
MF-249 (POWER, EJECT SWITCHES)
• SLV-436EE/
MA-203 (SERVO, SYSTEM
MF-249 BOARD
(X711/436EE)
CN001 8P
N.C 1
B GND 2
POWER LED 3
SIRCS OUT 4
VCC 5
KEY IN 1 6
KEY IN 0 7
KEY OUT 0 8
TO MA-203 BOARD CN501
(See page 4-20)
(X311/286EE)
CN002 8P
Q001 UN2211 LED DRIVE
IC001 SPIU58X
OUT
GND
VCC
EJECT
S002
ON/STANDBY
S001
D001 SLR-34MC3
D002 SLR-34MC3
R001 68
D001, D002 (ON/STANDBY)
IC001
REMOTE CONTROL RECEIVER
D004, 006-008 RD6.2ES-T1B
D004
D006
D007
D008
No Mark:E-E MODE
05
HI-2 BOARD (SLV-X711/436EE ONLY)
CN001 12P
VDD 1
LCD CS 2
COSMO - SO 3
COSMO - SI 4
S CLK 5
SYS RESET 6
KEY IN 1 7
KEY IN 0 8
POWER LED 9
N.C. 10
GND 11
KEY OUT 0 12
JL003
JL008
JL006
JL005
JL007
JL004
JL002
JL001
JL009
TO MA-203 BOARD CN502
(See page 4-20)
B2
B1
C1
VD01
D011
D012
D013
D014
D015
D016
D017
D018
CN002 8P
KEY IN 4 1
KEY IN 5 2
KEY IN 6 3
KEY IN 7 4
KEY OUT 0 5
KEY OUT 1 6
KEY OUT 2 7
KEY OUT 3 8
JL010
JL011
JL012
JL013
JL014
JL015
JL016
JL017
B5
B6
B7
B8
C1
C2
C3
C4
C005 10 16V
C004 0.01
SWITCH BLOCK
S002
BMS 1 8
BMS 2 7
BMS 3 6
COM 5
BMS 4 4
T1 3
CT 2
T2 1
JL018
JL019
JL020
D001 1SS119
D002 1SS119
D003 1SS119
D004 1SS119
B1
B2
B3
B4
C4
C3
REVIEW
REVERSE
FORWARD
FF
▷ PLAY
■ STOP
S002 DUAL MODE SHUTTLE
S001
PAUSE
Q004 2SB709A-R LED DRIVE
R047 2200
R048 4700
R036 220
R040 82
R039 82
C006 100 10V
D009 SEL2713K
D010 SEL2713K
D007 SEL2713K
D008 SEL2713K
05

MODE CONTROL

(SLV-X311/286EE)



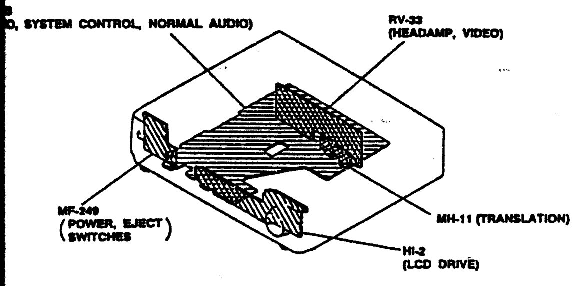
MF-249 BOARD



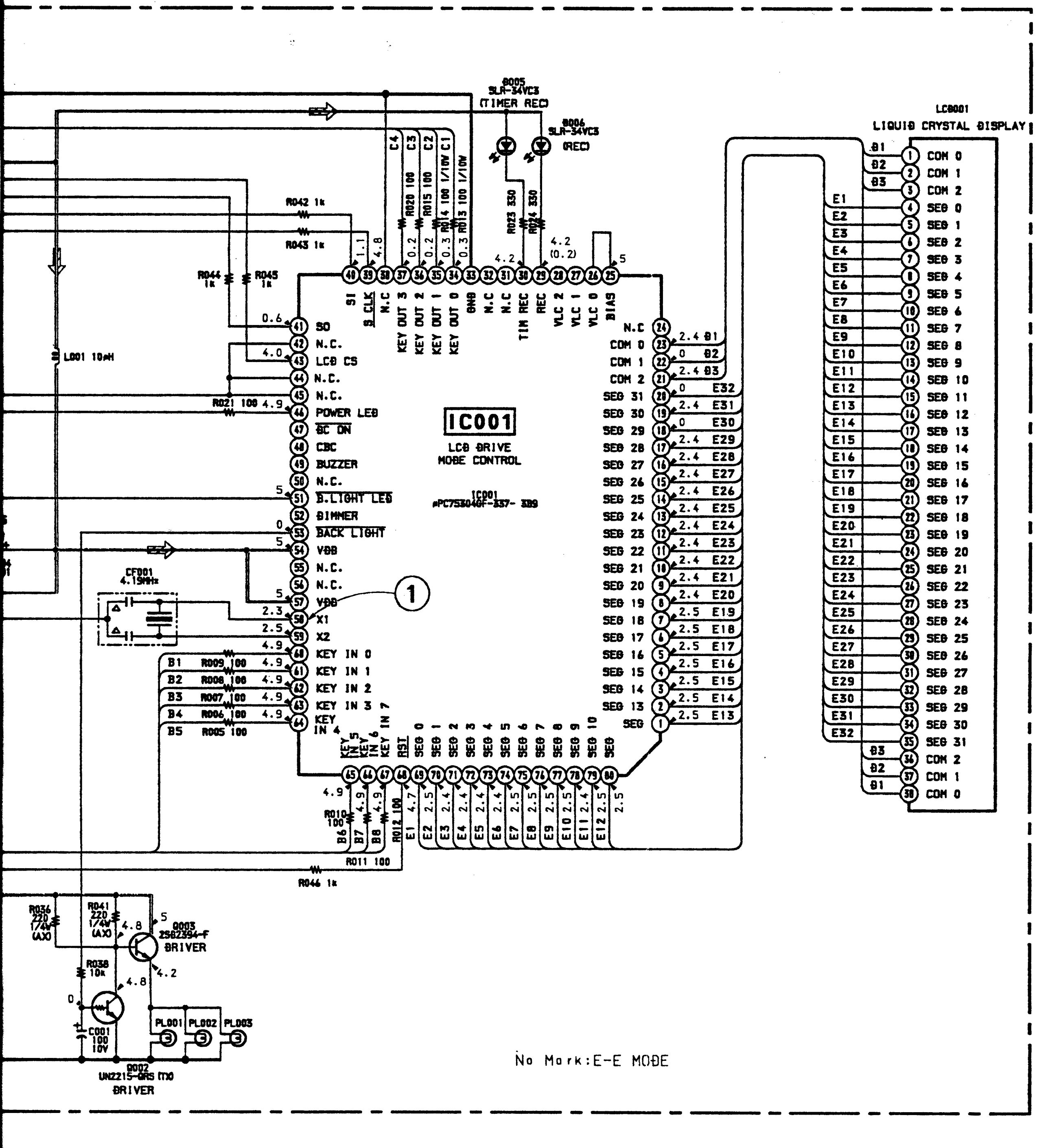
D4
D2
D1
D7
D8
STANDBY
CN1
CN2
1-651-142-
12
05

12	13	14	15	16	17	18	19	20	21	22	23

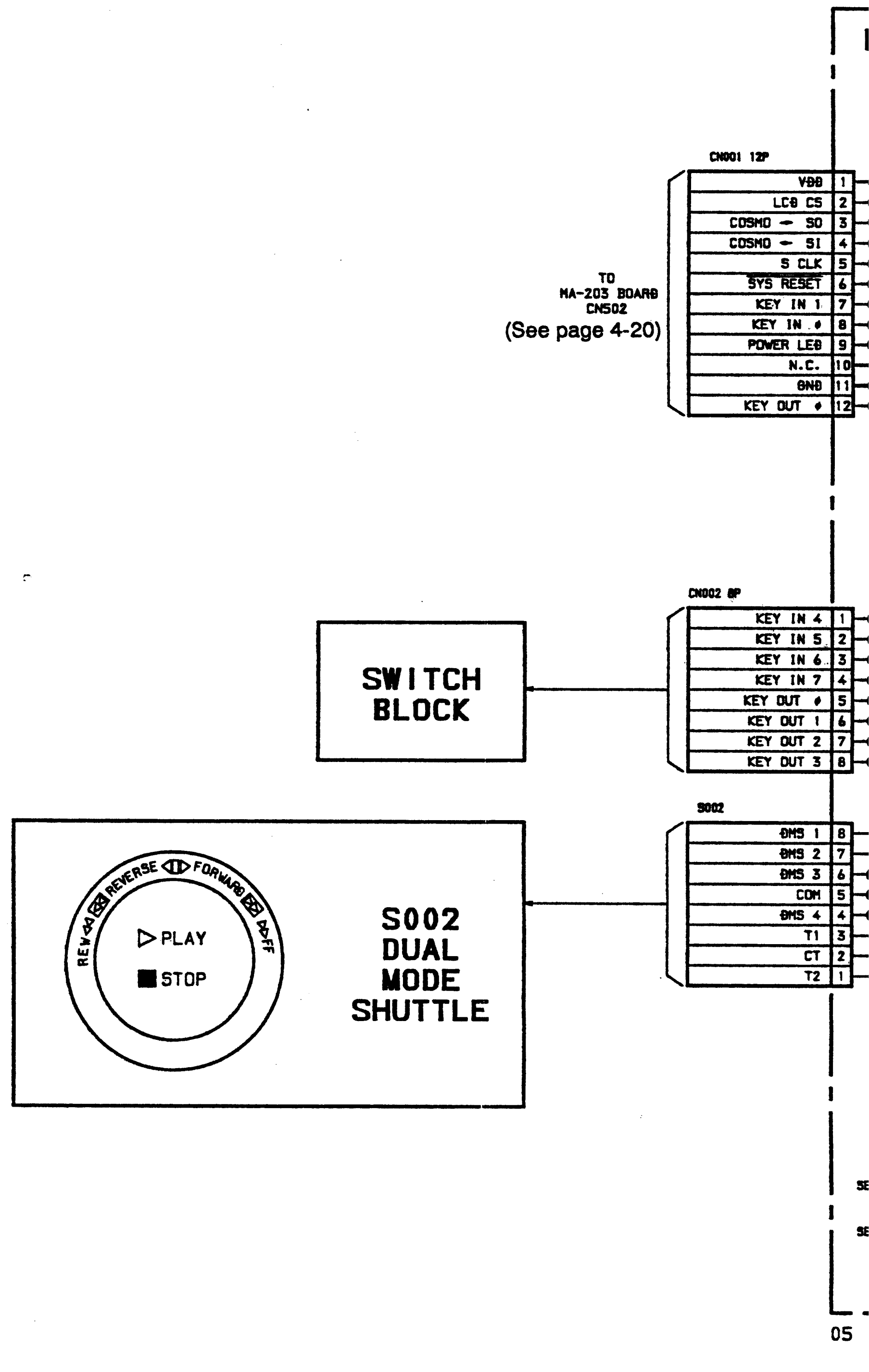
36EE/X711



D, SYSTEM CONTROL, NORMAL AUDIO)
RV-33 (HEADAMP, VIDEO)
MF-249 (POWER, EJECT SWITCHES)
MH-11 (TRANSLATION)
HI-2 (LCD DRIVE)



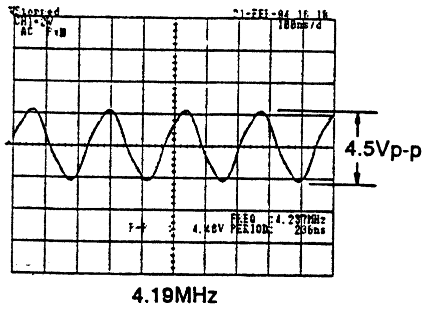
D005 SLR-34VC3 (TIMER REC)
D004 SLR-34VC3 (REC)
LCD001 LIQUID CRYSTAL DISPLAY
IC001 LCD DRIVE MODE CONTROL
IC001 μPC75304GF-337-3B9
CF001 4.19MHz
L001 10mH
R042 1k
R043 1k
R044 1k
R045 1k
R021 100
R023 330
R024 330
SO
N.C.
LCD CS
POWER LED
BC ON
CBC
BUZZER
B.LIGHT LED
DIMMER
BACK LIGHT
VDD
X1
X2
KEY IN 0
KEY IN 1
KEY IN 2
KEY IN 3
KEY IN 4
KEY OUT 3
KEY OUT 2
KEY OUT 1
KEY OUT 0
GND
TIM REC
REC
VLC 2
VLC 1
VLC 0
BIAS
COM 0
COM 1
COM 2
SEG 0 – SEG 31
E1 – E32
D1 D2 D3
Q003 2SB2394-F DRIVER
Q002 UN2215-GRS (TX) DRIVER
R036 220 1/4W (AX)
R041 220 1/4W (AX)
R038 10k
R046 1k
R011 100
C001 100 10V
PL001 PL002 PL003
1
No Mark:E-E MODE



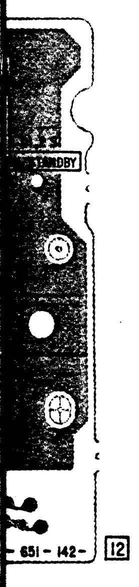
CN001 12P
VDD
LCD CS
COSMO → SO
COSMO ← SI
S CLK
SYS RESET
KEY IN 1
KEY IN 0
POWER LED
N.C.
GND
KEY OUT 0
TO MA-203 BOARD CN502
(See page 4-20)
CN002 8P
KEY IN 4
KEY IN 5
KEY IN 6
KEY IN 7
KEY OUT 0
KEY OUT 1
KEY OUT 2
KEY OUT 3
SWITCH BLOCK
S002
DMS 1
DMS 2
DMS 3
COM
DMS 4
T1
CT
T2
REW
REVERSE
FORWARD
FF
▷PLAY
■STOP
S002 DUAL MODE SHUTTLE
05

HI-2, 3 Boards

① IC001 (58)

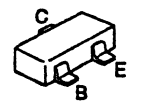


4.19MHz

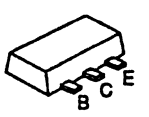


4-3. SEMICONDUCTORS

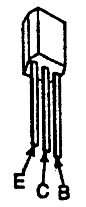
DTC114TK
MSD601-RT1
MSB709-RT1
UN211L
UN2111
UN2113
UN22IL
UN2211
UN2213
2SA1162-G
2SB709A-R
2SC2712-YG



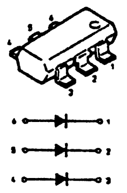
2SD1834
2SD999-CLCK



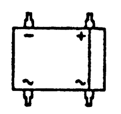
2SC4040-TL2-Q



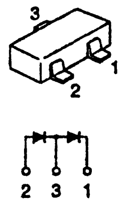
IMM10



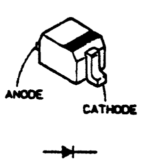
S1WB60



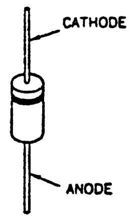
1SS226



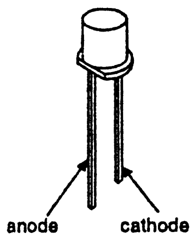
MA110


ANODE
CATHODE

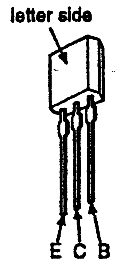
RD5.1E-L2


CATHODE
ANODE

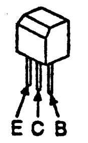
SEL3713K-TP5


anode
cathode

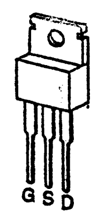
2SA1175-HFE


letter side
E C B

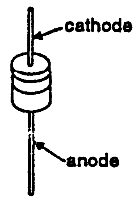
2SB733-34
2SD773



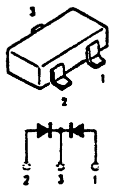
2SD2394-F



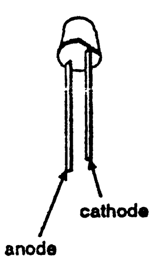
RD33ES-B2
RD4.3ES-B1
RD5.1ES-B2
RD6.2ES-B2
1SS119
11ES2

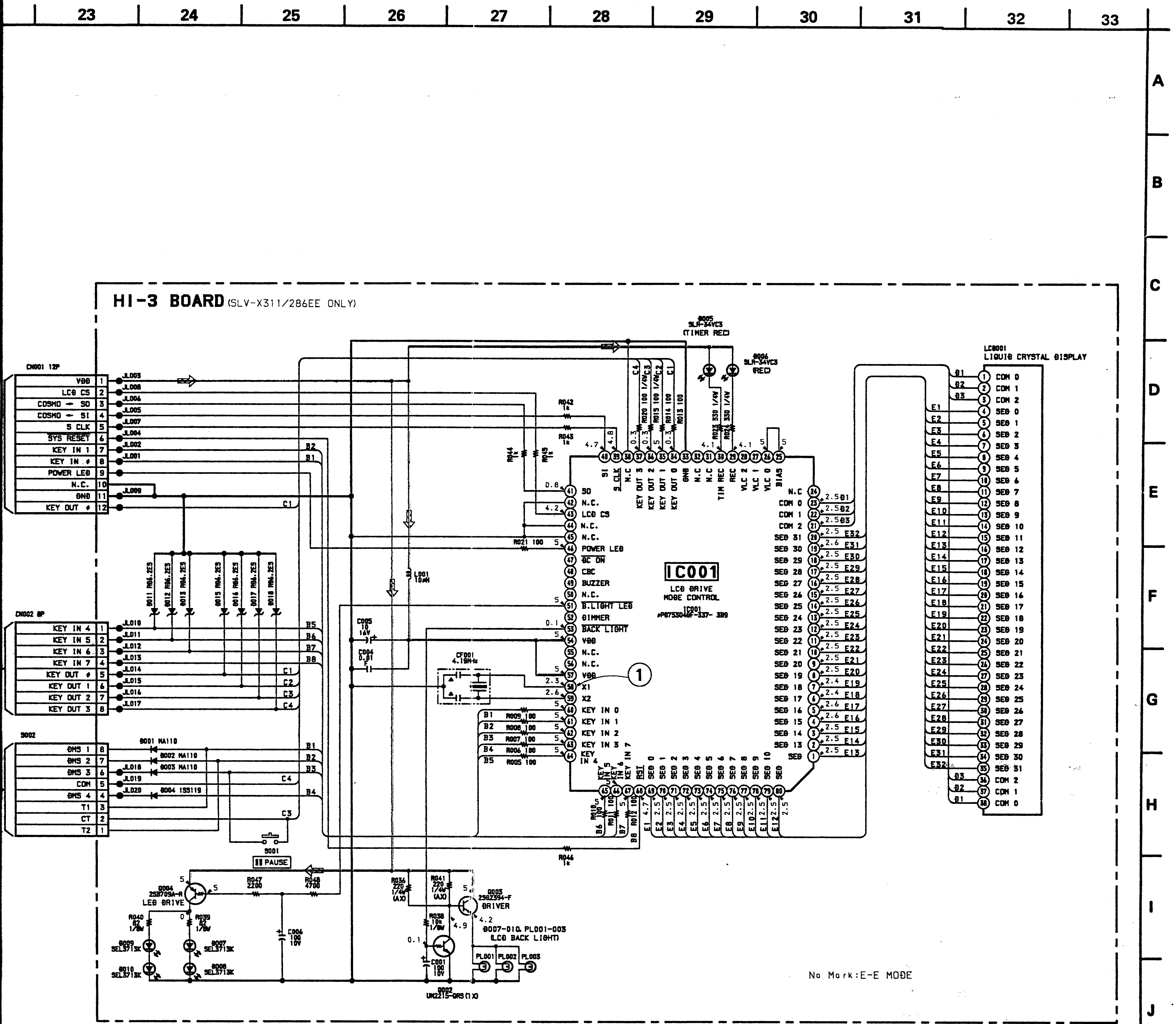

cathode
anode

1SS184



SLR-34MC3
SLR-34VC3


anode
cathode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A
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C
D
E
F
G
H
I
J
CN001 12P
VDD
LCD CS
COSMO - SO
COSMO - SI
S CLK
SYS RESET
KEY IN 1
KEY IN 0
POWER LED
N.C.
GND
KEY OUT 0
CN002 8P
KEY IN 4
KEY IN 5
KEY IN 6
KEY IN 7
KEY OUT 0
KEY OUT 1
KEY OUT 2
KEY OUT 3
S002
DMS 1
DMS 2
DMS 3
COM
DMS 4
T1
CT
T2
D005 SLR-34VC3 (TIMER REC)
D006 SLR-34VC3 (REC)
IC001
LCD DRIVE
MODE CONTROL
LCD001
LIQUID CRYSTAL DISPLAY
CF001 4.19MHz
L001 10µH
S001
II PAUSE
Q004 2SB709A-R LED DRIVE
Q003 2SD2394-F DRIVER
Q002 UN2215-DRS(1X)
D007-010, PL001-003 (LCD BACK LIGHT)
D009 SEL3713K
D010 SEL3713K
D007 SEL3713K
D008 SEL3713K
①
05

HI-3 BOARD (SLV-X311/286EE ONLY)

No Mark:E-E MODE

SECTION 5
REPAIR PARTS LIST

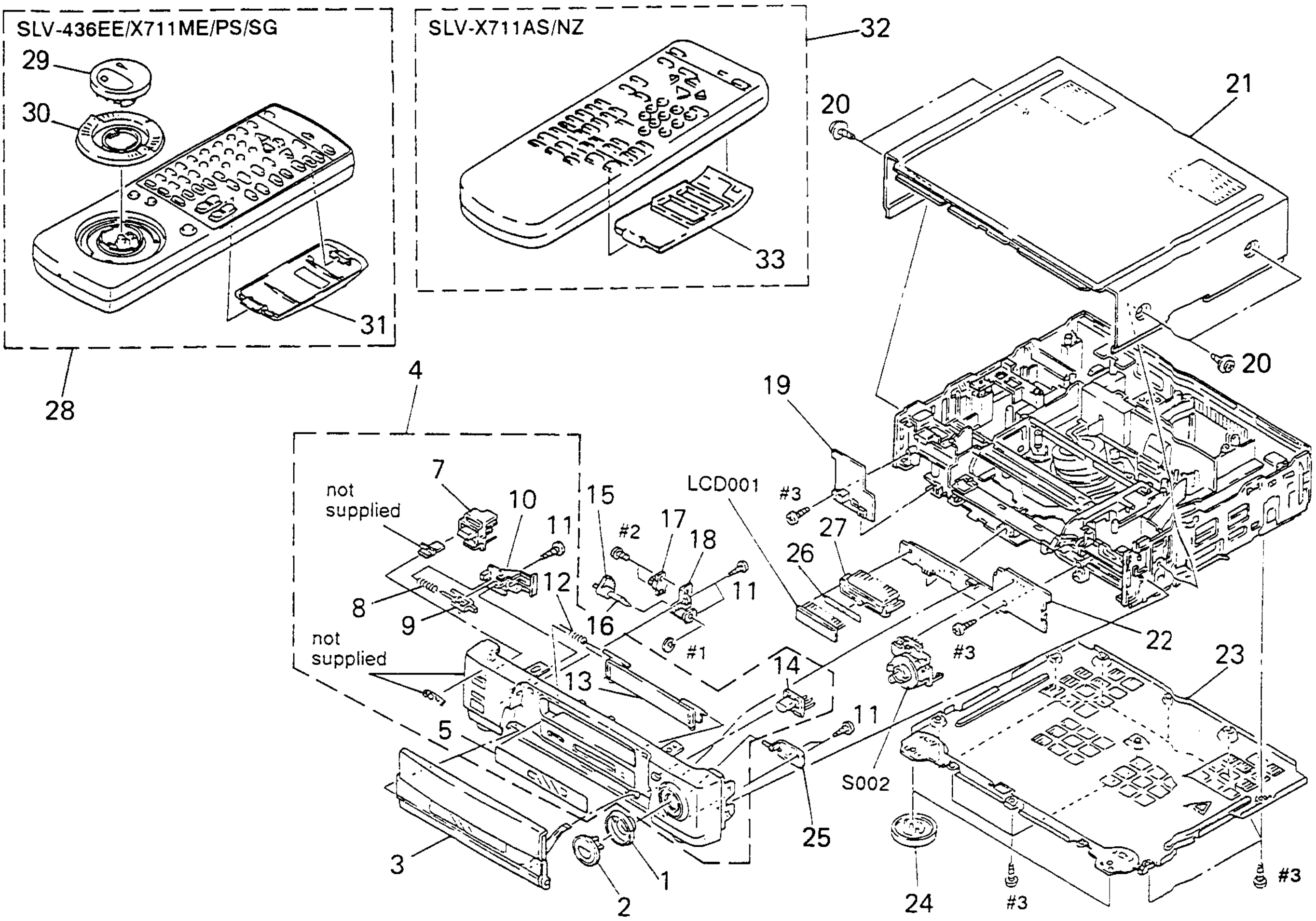
5-1. EXPLODED VIEWS

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ ↑
  Parts Color Cabinet's Color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

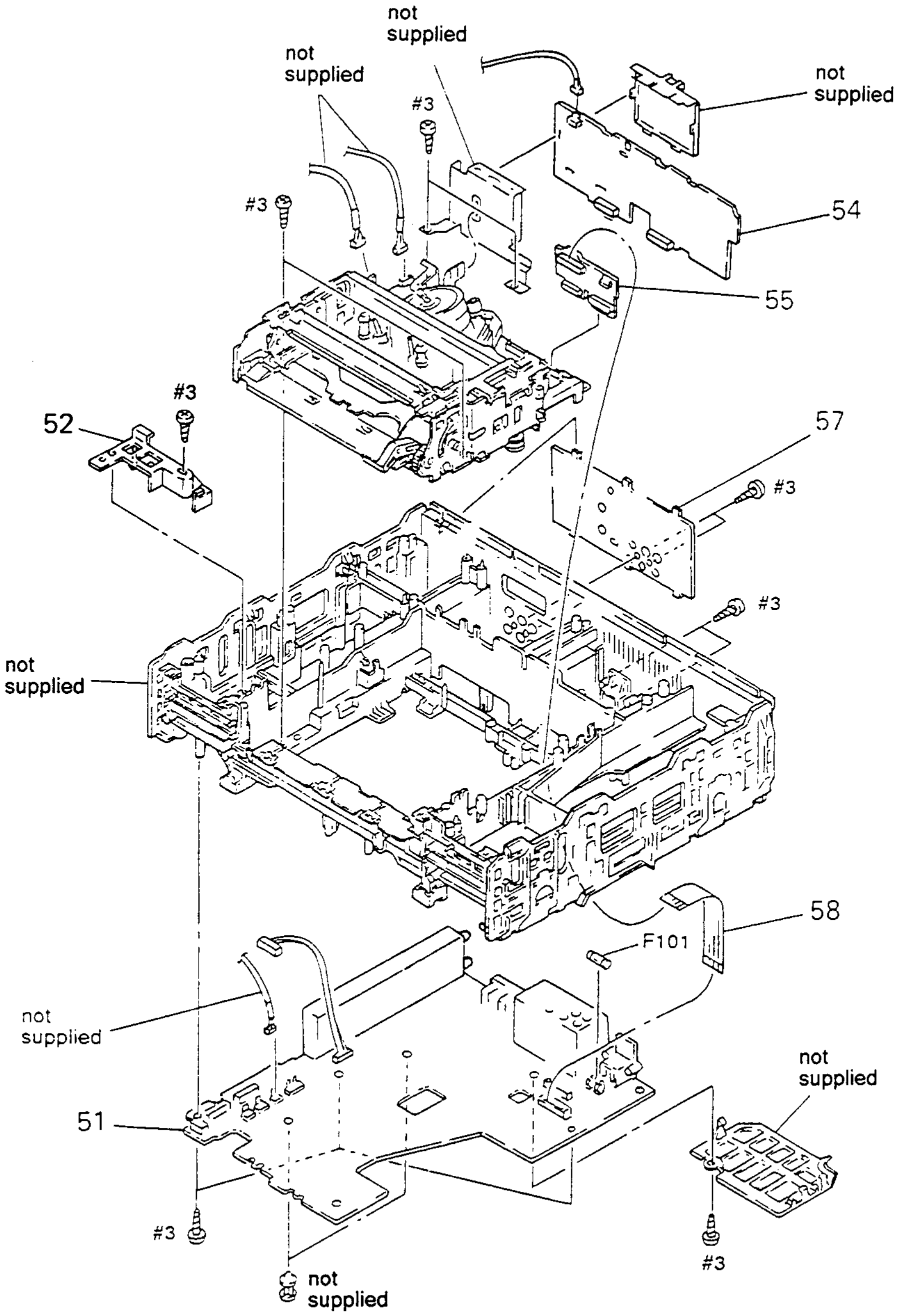
5-1-1. SLV-436EE/X711 FRONT PANEL ASSEMBLY



Ref. No.	Part No.	Description	Remark
1	X-3943-556-1	RING ASSY. SHUTTLE (286EE/436EE)	
1	X-3943-669-1	RING ASSY. SHUTTLE (X311/X711)	
2	X-3943-557-1	BUTTON ASSY. FUNCTION (286EE/436EE)	
2	X-3943-670-1	BUTTON ASSY. FUNCTION (X311/X711)	
3	1-467-489-11	SWITCH BLOCK. CONTROL (X711:ME. SG. PS)	
3	1-467-489-21	SWITCH BLOCK. CONTROL (436EE)	
3	1-467-489-31	SWITCH BLOCK. CONTROL (X711:NZ. AS)	
4	X-3943-663-1	PANEL ASSY. FRONT (436EE)	
4	X-3943-665-1	PANEL ASSY. FRONT (X711:ME. SG. PS)	
4	X-3943-829-1	PANEL ASSY. FRONT (X711:NZ. AS)	
5	3-957-211-01	PLATE. ORNAMENTAL. DOOR	
7	3-957-389-01	BUTTON. POWER/EJECT (286EE/436EE)	
7	3-957-389-21	BUTTON. POWER/EJECT (X311/X711)	
8	3-957-388-01	SPRING. COMPRESSION	
9	3-944-564-01	CLAW. LOCK	
10	3-957-212-01	HOLDER. LOCK CLAW	
11	4-921-277-11	SCREW (B2. 6X8). TAPPING. BIND	
12	3-946-614-01	SPRING. FL	
13	3-954-735-31	DOOR. CASSETTE (436EE)	
13	3-954-735-71	DOOR. CASSETTE (X711)	
14	3-957-210-01	BUTTON. PAUSE (436EE)	
14	3-957-210-11	BUTTON. PAUSE (X711)	
15	3-957-382-01	GEAR. FULCRUM	
* 16	3-957-383-01	SHAFT. FULCRUM GEAR	

Ref. No.	Part No.	Description	Remark
17	3-319-224-11	DAMPER. SMALL	
* 18	3-957-381-01	PLATE. FULCRUM (LEFT). DOOR	
* 19	A-6721-600-A	MF-249 BOARD. COMPLETE	
20	3-710-901-11	SCREW. TAPPING	
* 21	3-957-396-11	CASE. UPPER	
* 22	A-6727-550-A	HI-2 BOARD. COMPLETE (436EE)	
* 22	A-6727-556-A	HI-2 BOARD. COMPLETE (X711)	
* 23	3-957-386-01	PLATE. BOTTOM	
24	3-957-246-01	INSULATOR	
* 25	X-3943-587-1	PLATE (RIGHT) ASSY. FULCRUM	
* 26	3-957-230-01	ILLUMINATOR	
* 27	3-957-206-01	HOLDER. LCD	
28	1-467-485-81	REMOTE COMMANDER (RMT-V141K) (SLV-436EE/X711ME/PS/SG)	
29	X-3943-638-1	BUTTON ASSY	
30	3-957-513-11	RING. SHUTTLE	
31	3-708-817-01	COVER. BATTERY (SLV-436EE/X711ME/PS/SG)	
32 -	1-467-757-61	REMOTE COMMANDER (RMT-V148M) (SLV-X711AS/NZ)	
33	3-943-535-01	COVER. BATTERY (SLV-X711AS/NZ)	
LCD001	1-810-409-11	DISPLAY PANEL. LIQUID CRYSTAL (X311/X711)	
LCD001	1-810-409-21	DISPLAY PANEL. LIQUID CRYSTAL (286EE/436EE)	
S002 .	1-692-840-21	SWITCH. ROTARY (PLAY/STOP/FF/REW)	

5-1-2. SLV-436EE/X711 CHASSIS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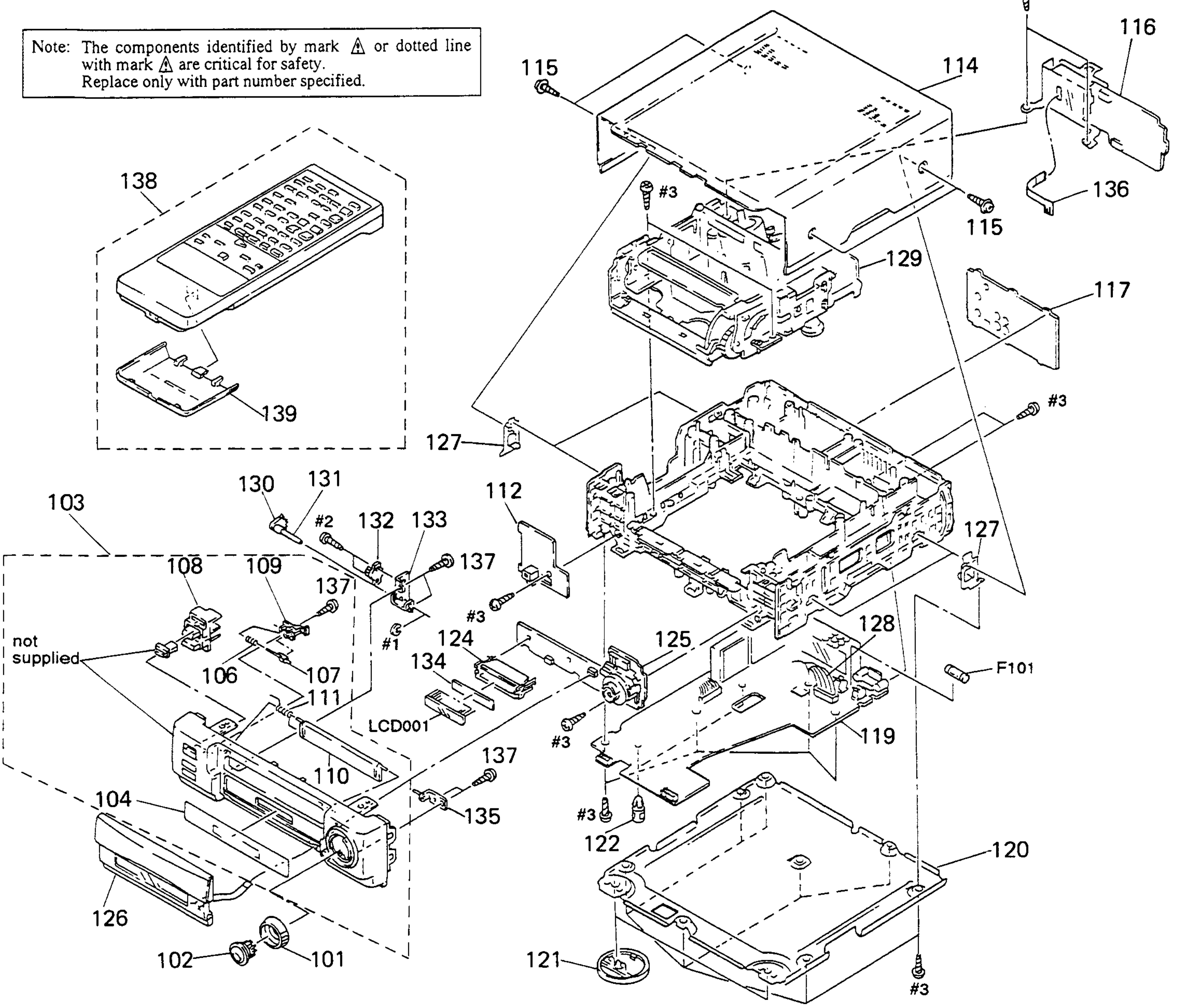
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
* 51	A-6782-285-A	MA-203 BOARD, COMPLETE	(X711:NZ)
* 51	A-6782-286-A	MA-203 BOARD, COMPLETE	(X711:AS)
* 51	A-6782-287-A	MA-203 BOARD, COMPLETE	(436EE)
* 51	A-6782-289-A	MA-203 BOARD, COMPLETE	(X711:ME, SG, PS)
* 52	3-957-215-01	HOLDER (TU), FRAME	
* 54	A-6721-599-A	RV-33 BOARD, COMPLETE	(X711:NZ, AS)
* 54	A-6721-601-A	RV-33 BOARD, COMPLETE	(436EE/X711:ME, SG, PS)
* 55	A-6727-516-A	MH-11 BOARD, COMPLETE	
* 57	3-957-656-01	PLATE, JACK (PAL), REAR	(436EE)
* 57	3-957-656-11	PLATE, JACK (PAL), REAR	(X711:PS)
* 57	3-957-656-21	PLATE, JACK (PAL), REAR	(X711:AS)
* 57	3-957-656-31	PLATE, JACK (PAL), REAR	(X711:NZ)
* 57	3-957-656-51	PLATE, JACK (PAL), REAR	(X711:ME)
* 57	3-957-656-61	PLATE, JACK (PAL), REAR	(X711:SG)
58	1-751-794-21	CABLE, FFC (FMD-5)	
⚠F101	1-576-228-11	FUSE (H.B.C)	

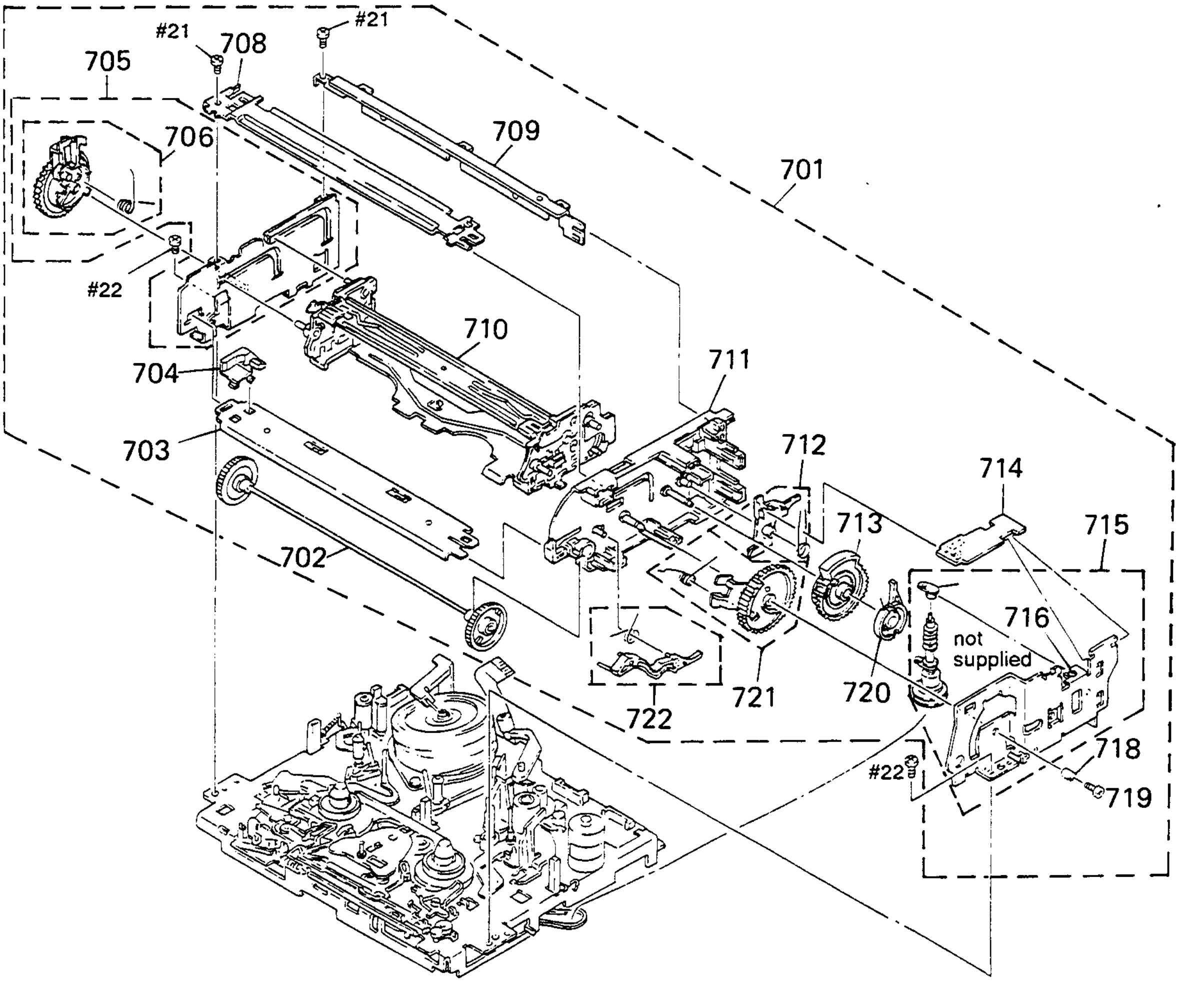
5-1-3. SLV-286EE/X311 FRONT PANEL ASSEMBLY AND CHASSIS

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.



Ref. No.	Part No.	Description	Remark
101	X-3943-556-1	RING ASSY, SHUTTLE (286EE/436EE)	
101	X-3943-669-1	RING ASSY, SHUTTLE (X311/X711)	
102	X-3943-557-1	BUTTON ASSY, FUNCTION (286EE/436EE)	
102	X-3943-670-1	BUTTON ASSY, FUNCTION (X311/X711)	
103	X-3943-667-1	PANEL ASSY, FRONT (286EE)	
103	X-3943-671-1	PANEL ASSY, FRONT (X311)	
104	3-957-211-01	PLATE, ORNAMENTAL, DOOR	
106	3-957-388-01	SPRING, COMPRESSION	
107	3-944-564-01	CLAW, LOCK	
108	3-957-389-01	BUTTON, POWER/EJECT (286EE/436EE)	
108	3-957-389-21	BUTTON, POWER/EJECT (X311/X711)	
* 109	3-957-548-01	HOLDER, LOCK CLAW	
110	3-954-735-51	DOOR, CASSETTE (286EE)	
110	3-954-735-61	DOOR, CASSETTE (X311)	
111	3-946-614-01	SPRING, FL	
* 112	A-6721-602-A	MF-249 BOARD, COMPLETE	
* 114	3-957-219-11	CASE, UPPER	
115	3-710-901-11	SCREW, TAPPING	
* 116	A-6721-603-A	RV-33 BOARD, COMPLETE	
* 117	3-957-550-01	PLATE, JACK (PAL), REAR (286EE)	
* 117	3-957-550-11	PLATE, JACK (PAL), REAR (X311:PS)	
* 117	3-957-550-41	PLATE, JACK (PAL), REAR (X311:SG)	
* 119	A-6782-288-A	MA-203 BOARD, COMPLETE (X311)	
* 119	A-6782-290-A	MA-203 BOARD, COMPLETE (286EE)	
* 120	3-957-226-01	PLATE, BOTTOM	
121	3-957-246-01	INSULATOR	
122	3-682-057-11	SPACER (SMALL)	
* 124	3-957-206-01	HOLDER, LCD	
* 125	A-6727-551-A	HI-3 BOARD, COMPLETE (286EE)	
* 125	A-6727-555-A	HI-3 BOARD, COMPLETE (X311)	
126	1-467-488-21	SWITCH BLOCK, CONTROL (X311)	
126	1-467-488-61	SWITCH BLOCK, CONTROL (286EE)	
* 127	3-957-227-01	STOPPER (NNX), UPPER CASE	
128	1-751-794-21	CABLE, FFC (FMD-5)	
* 129	A-6727-552-A	MH-12 BOARD, COMPLETE	
130	3-957-382-01	GEAR, FULCRUM	
* 131	3-957-383-01	SHAFT, FULCRUM GEAR	
132	3-319-224-11	DAMPER, SMALL	
* 133	3-957-381-01	PLATE, FULCRUM (LEFT), DOOR	
* 134	3-957-230-01	ILLUMINATOR	
* 135	X-3943-587-1	PLATE (RIGHT) ASSY, FULCRUM	
136	1-651-145-11	FP-88 FLEXIBLE BOARD	
137	4-921-277-11	SCREW (B2.6X8), TAPPING, BIND	
138	1-467-486-21	REMOTE COMMANDER (RMT-V132J)	
139	3-948-734-01	COVER, BATTERY	
⚠F101	1-576-228-11	FUSE (H.B.C)	
LCD001	1-810-409-11	DISPLAY PANEL, LIQUID CRYSTAL (X311/X711)	
LCD001	1-810-409-21	DISPLAY PANEL, LIQUID CRYSTAL (286EE/436EE)	

5-1-4. FL CASSETTE COMPARTMENT ASSEMBLY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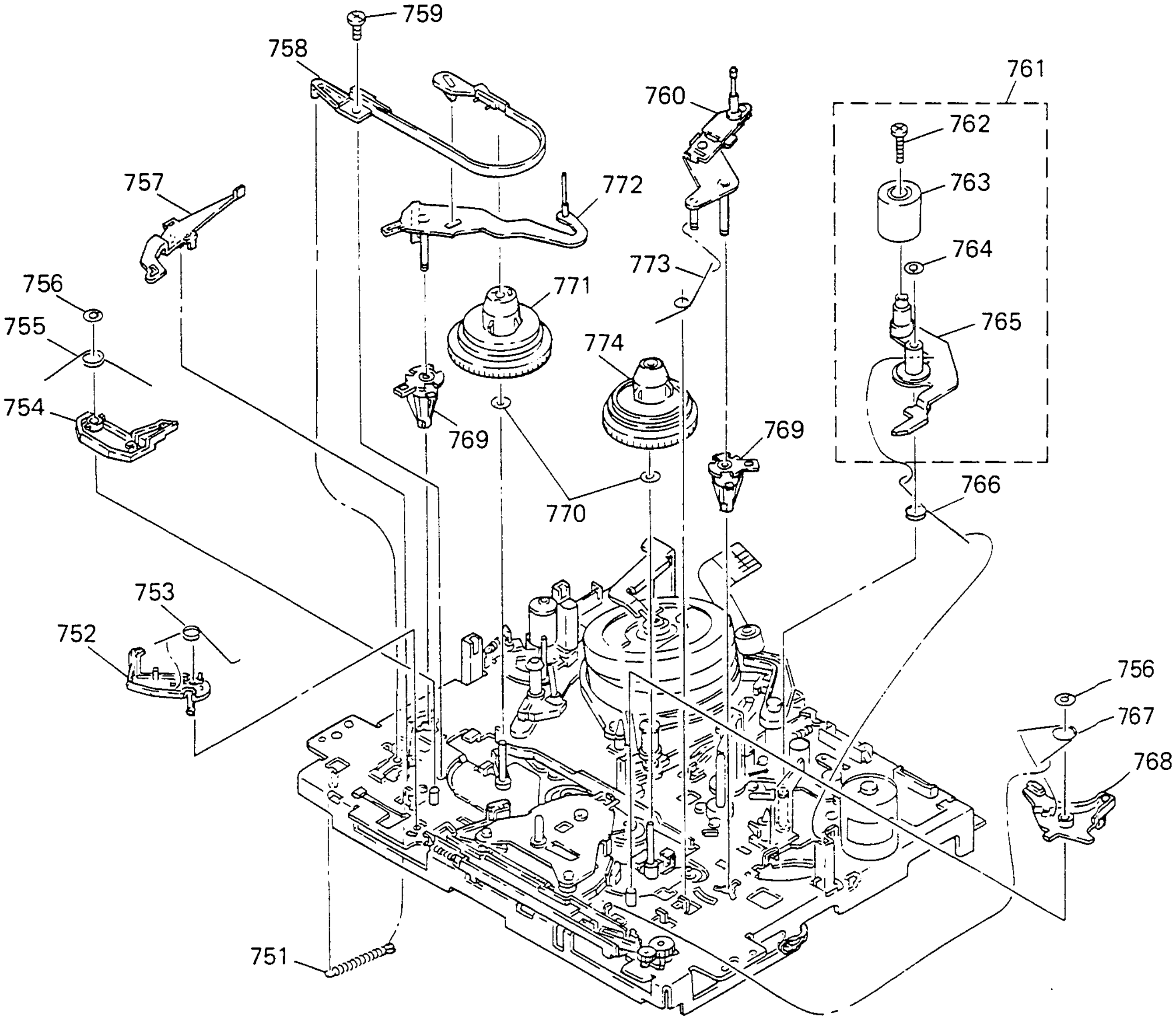
Ref. No.	Part No.	Description	Remark
701	3-946-965-01	FL ASSY	
702	3-946-983-01	GEAR ASSY, SYNCHRO	
703	3-946-993-01	ANGLE, FRONT	
704	3-946-994-01	GUIDE (L), CASSETTE	
705	3-946-978-01	FRAME (L) ASSY	
706	3-947-010-01	GEAR (L) ASSY, LIFT	
707	3-947-009-01	RIVETING, FRAME (L)	
708	3-946-995-01	PLATE, UPPER	
709	3-947-008-01	ANGLE, REAR	
710	3-946-979-01	HOLDER ASSY, CASSETTE	
711	3-947-011-01	FRAME (R)	
712	3-946-991-01	LEVER ASSY, SWITCH	
713	3-946-980-01	WHEEL ASSY, WORM	
714	3-946-992-01	PWB (B) ASSY, FL	
715	3-946-990-01	COVER ASSY, FRAME	
716	3-947-013-01	COVER, FRAME	
717	3-947-020-01	BEARING (A), F WORM	
718	3-948-705-01	COLLAR	
719	3-948-706-01	SCREW (3X6)	
720	3-946-981-01	ARM ASSY, SWITCH	
721	3-946-982-01	GEAR (R) ASSY, LIFT	
722	3-947-012-01	LEVER ASSY, LIFT	

5-1-5. MECHANISM CHASSIS ASSEMBLY (1)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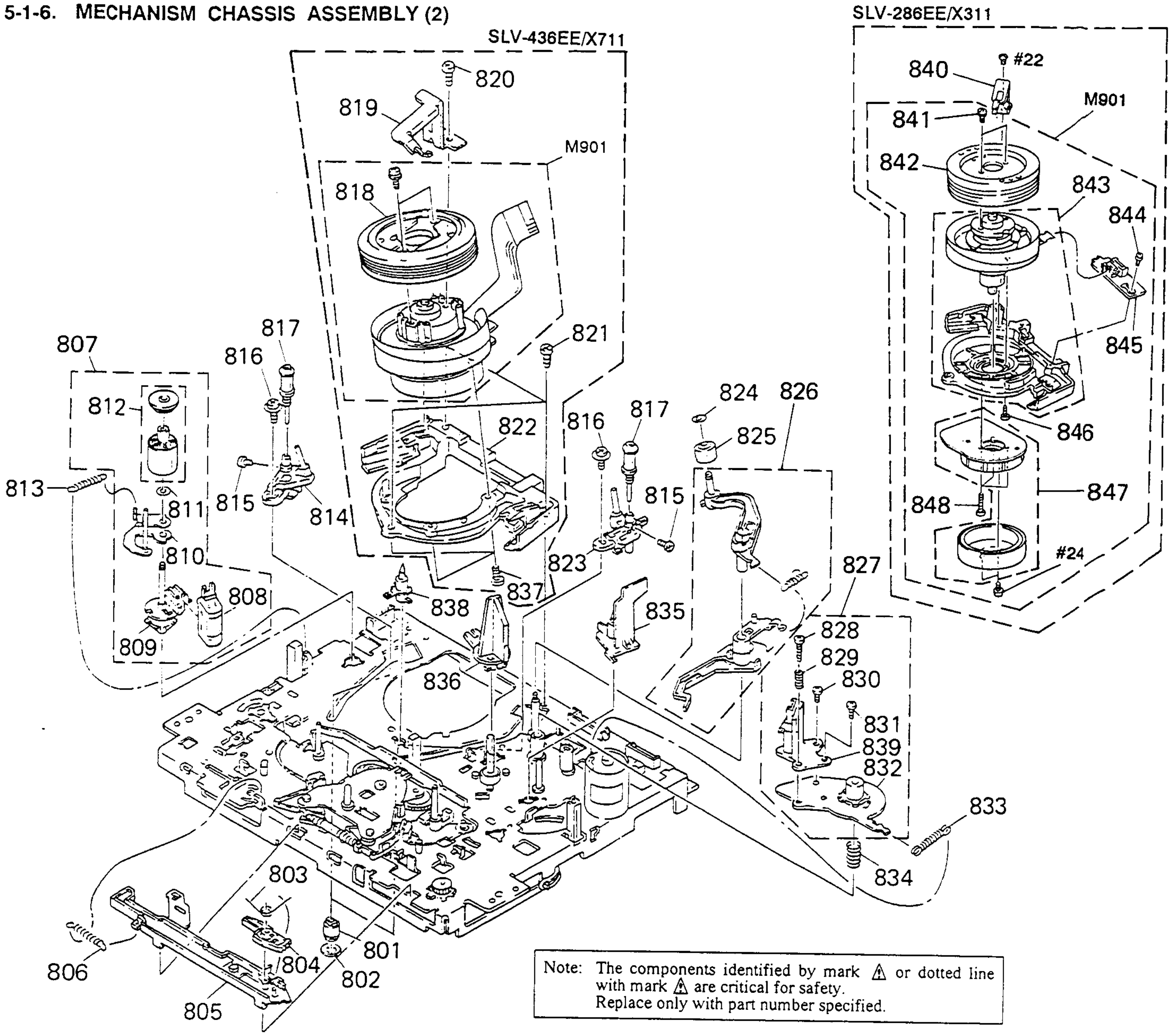
Ref. No.	Part No.	Description	Remark
751	3-946-937-01	SPRING, BT	
752	3-946-959-01	ARM, REC	
753	3-946-947-01	SPRING, REC ARM	
754	3-946-914-01	ARM, SS BRAKE	
755	3-946-915-01	SPRING, SS ARM	
756	3-946-916-01	CUT (3X6X0.5), HLW	
757	3-946-946-01	ARM, REC SWITCH	
758	3-946-935-01	BAND ASSY, BT	
759	3-946-966-01	SCREW (2.6X5), +C TIGHT	
760	3-947-021-01	ARM ASSY, RG	
761	3-947-004-01	ARM ASSY, P ROLLER	
762	3-947-007-01	SCREW (2.6X4), + BIND	
763	3-947-005-01	PINCH ROLLER	
764	3-947-024-01	HL (C) (3.5X5.5X0.5)	
765	3-947-006-01	RIVETING, P ROLLER ARM	
766	3-947-025-01	SPRING, P ARM	
767	3-946-913-01	SPRING, TS ARM	
768	3-946-912-01	ARM ASSY, TS BRAKE	
769	3-946-936-01	METAL, BT ARM	
770	3-947-003-01	WASHER (2.5X4.5X0.5)	
771	3-947-997-01	TABLE ASSY, S REEL	
772	3-946-934-01	ARM ASSY, TENSION	
773	3-947-022-01	SPRING, RG ARM	
774	3-947-002-01	TABLE ASSY, T REEL	

5-1-6. MECHANISM CHASSIS ASSEMBLY (2)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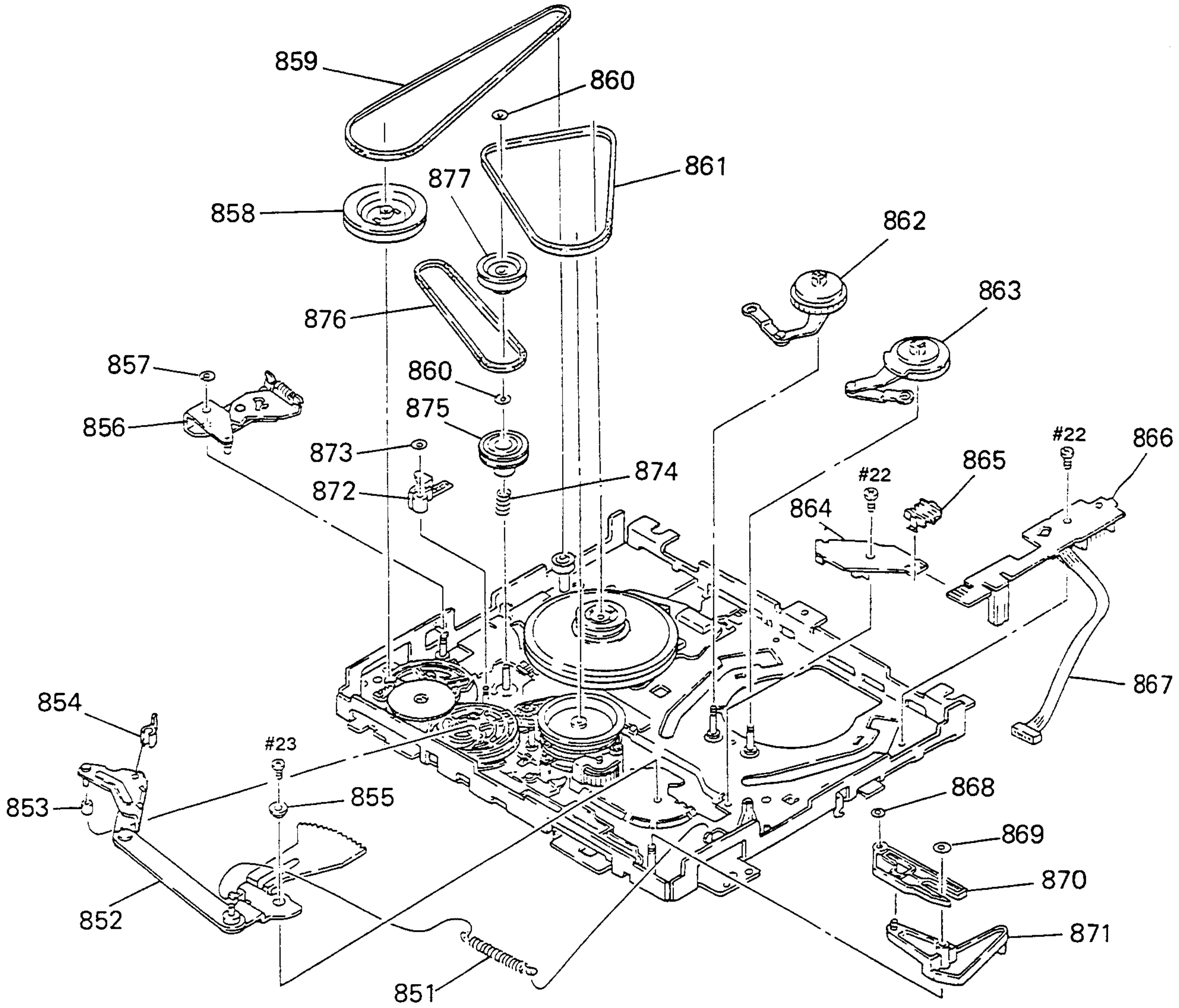
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
801	3-947-077-01	BOSS. LOADING	
802	3-947-079-01	HL (C) (4.7X7X0.5)	
803	3-947-016-01	SPRING. TRIGGER HOOK	
804	3-947-014-01	HOOK. BK TRIGGER	
805	3-947-001-01	PLATE. SLIDE. BK	
806	3-947-015-01	SPRING. BK SLIDE	
807	3-946-972-01	FE (BASE) ASSY	
808	3-946-973-01	HEAD (HV113001). FE	
809	3-946-974-01	HEAD (HVFHG0003). FE	
810	3-946-976-01	ARM ASSY. F POST	
811	3-946-977-01	CUT (1.6X3.8X0.3). W	
812	3-946-975-01	ROLLER ASSY. IMPEDANCE	
813	3-948-474-01	SPRING. F POST	
814	3-947-071-01	L BLOCK (L) ASSY	
815	3-947-074-01	SCREW (2X2.3)	
816	3-947-078-01	SCREW (2.6X3). +CUP	
817	3-947-073-01	POST. ROLLER	
818	8-848-540-01	UPPER DRUM ASSY (DZR-21-R) (436EE/X711)	
819	3-949-180-01	GROUND ASSY. SD	
820	3-949-182-01	SCREW (2.6X5). +C TIGHT	
821	3-947-066-01	SCREW (3X7). +C TIGHT	
822	3-949-179-01	BASE ASSY. CYLINDER	
823	3-947-072-01	L BLOCK (R) ASSY	
824	3-947-625-01	CUT (2.1X5X0.3). POLY-SLIDER (W)	
825	3-947-624-01	ROLLER. CLEANING	
826	3-947-080-01	LEVER ASSY. CLEANING	
827	3-947-081-01	AH (BASE) ASSY	
828	3-946-928-01	SCREW. AZIMUTH SP	
829	3-947-083-01	SP. AZIMUTH	
830	3-946-930-01	SCREW (2.6X7). + PAN	
831	3-946-929-01	SCREW (3X6). PAN	
832	3-946-931-01	HOLDER ASSY. AH (BASE)	
833	3-946-932-01	SPRING. X ADJ	
834	3-946-933-01	SPRING. AH (BASE)	
835	3-947-069-01	GUIDE BLOCK	
836	3-947-068-01	GUIDE ASSY. TAPE	
837	3-949-181-01	SCREW (3X8). + PAN	
838	3-947-070-01	BISS. CASSETTE GUIDE	
839	3-947-082-01	HEAD (HVMZA1136). ACE	
840	3-947-999-01	GROUND ASSY. DRUM (286EE/X311)	
841	3-947-060-01	SCREW (3X8) (286EE/X311)	
842	3-949-187-01	DRUM (TPB3-011). UPPER (286EE/X311)	
843	3-947-046-01	CYLINDER (MOUNT) (286EE/X311)	
844	3-947-064-01	SCREW (2.6X6). S TIGHT (286EE/X311)	
845	3-947-047-01	PC BOARD ASSY. VIDEO OUT (REC/PB HEAD) (286EE/X311)	
846	3-947-06-01	SCREW (2X6). CAMERA B TIGHT (286EE/X311)	
847	3-947-043-01	MOTOR (E20EL). DRUM (286EE/X311)	
848	3-947-065-01	SCREW (2.6X16) (286EE/X311)	
⚠M901	8-848-597-11	DRUM ASSY (DZH-48A-R) (436EE/X711)	
⚠M901	3-949-186-01	CYLINDER ASSY (DRUM) (286EE/X311)	

5-1-7. MECHANISM CHASSIS ASSEMBLY (3)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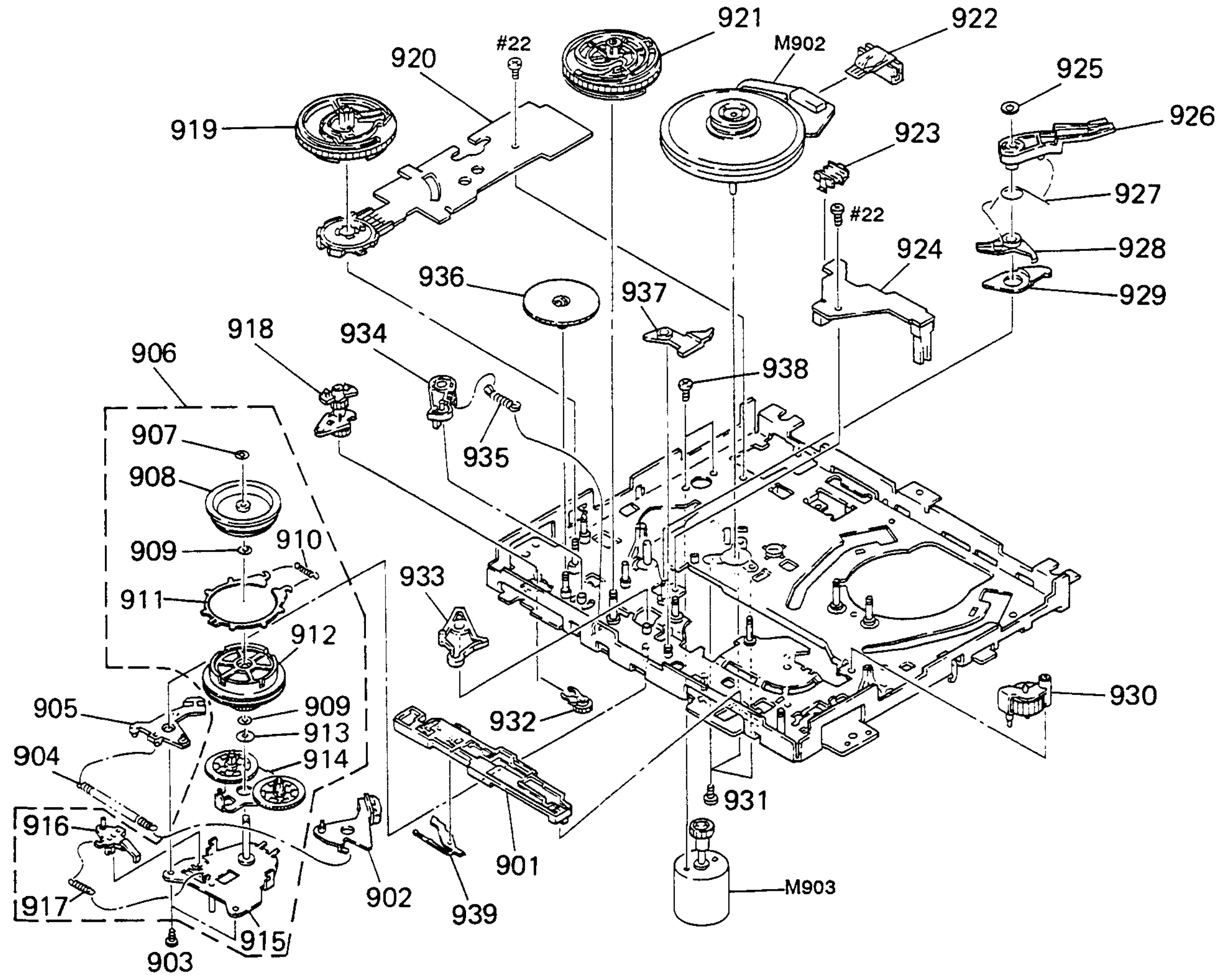
Ref. No.	Part No.	Description	Remark
851	3-946-927-01	SPRING, L GR PLATE	
852	3-946-926-01	RIVETING, L JOINT PLATE	
853	3-946-941-01	ROLLER, CAM	
854	3-946-945-01	STOPPER, L LEVER	
855	3-946-940-01	COLLAR, L GEAR PLATE	
856	3-947-026-01	PLATE ASSY	
857	3-947-027-01	CUT (3X6X0.5), HLW	
858	3-946-921-01	PULLEY, LOADING	
859	3-946-923-01	BELT, LOADING	
860	3-946-963-01	CUT (2.1X4X0.4)	
861	3-946-999-01	BELT, DRIVE	
862	3-947-075-01	GEAR (L) ASSY, T THREADING	
863	3-947-076-01	GEAR (R) ASSY, T THREADING	
864	3-946-956-01	PWB ASSY, S SENSOR	
865	3-946-948-01	JOINER (MCN40011), PWB	
866	3-949-184-01	PWB (B) ASSY, DM	
867	3-949-190-01	WIRE ASSY, DM	
868	3-946-967-01	CUT (2.1X4X0.5)	
869	3-946-968-01	CUT (3X7.5X0.5), HLW	
870	3-946-939-01	PLATE, UP, BT PULL	
871	3-946-938-01	LEVER, BT	
872	3-946-961-01	ARM, BREAKER	
873	3-946-964-01	CUT (2.1X5X0.5)	
874	3-946-960-01	SPRING, BREAKER	
875	3-946-951-01	PULLEY, EJECT	
876	3-946-962-01	BELT, FL	
877	3-946-950-01	PULLEY ASSY, RE	

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1-8. MECHANISM CHASSIS ASSEMBLY (4)



Ref. No.	Part No.	Description	Remark
901	3-946-943-01	PLATE, SLIDE, M	
902	3-947-017-01	ARM (L) ASSY, BRAKE	
903	3-947-000-01	SCREW (2X4), +	
904	3-947-019-01	SPRING, BRAKE ARM	
905	3-947-018-01	ARM (R) ASSY, BRAKE	
906	3-951-590-01	PLATE ASSY, SUB	
907	3-946-996-01	CUT (2.1X5X0.3), P.W.	
908	3-946-984-01	PULLEY ASSY, CLUTCH	
909	3-946-997-01	HL (W) (2.5X4.5X0.25)	
910	3-946-986-01	SPRING, CHANGE RING	
911	3-946-985-01	RING, CHANGE	
912	3-951-591-01	CLUTCH ASSY	
913	3-946-989-01	HL (W) (C) (6.4X9X0.3)	
914	3-946-988-01	PLATE ASSY, GEAR	
915	3-952-168-01	RIVETING, SUB PLATE	
916	3-946-987-01	ARM, CENTER RING	
917	3-947-998-01	SPRING, CENTER RING ARM	
918	3-946-919-01	METAL ASSY, L PULLEY	
919	3-946-924-01	GEAR, P CAM	
920	3-946-954-01	PWB ASSY, BASE	
921	3-946-925-01	GEAR, L CAM	
922	3-947-029-01	LEAD ASSY, CM	
923	3-946-948-01	JOINER (MCN40011), PWB	
924	3-946-955-01	PWB ASSY, T SENSOR	
925	3-947-035-01	CUT (2.6X6X0.5)	
926	3-947-033-01	LEVER, CB RETURN	
927	3-947-031-01	SPRING, C BRAKE	
928	3-947-032-01	LEVER, C BRAKE	
929	3-947-030-01	ARM ASSY, C BRAKE	
930	3-946-998-01	ARM ASSY, RF GEAR	
931	3-947-034-01	SCREW (2.6X7), + C TIGHT	
932	3-946-920-01	ARM ASSY, TRG GEAR	
933	3-946-942-01	LEVER, M	
934	3-946-910-01	ARM, BK RELEASE	
935	3-946-911-01	SPRING, RESET	
936	3-946-922-01	GEAR, LOADING	
937	3-946-952-01	STOPPER, GEAR PLATE	
938	3-946-918-01	SCREW (3X4)	
939	3-946-944-01	LEVER	
940	3-946-958-01	SWITCH, MODE	
⚠M902	3-947-028-01	MOTOR (F2QKB38) (CAPSTAN)	
M903	3-946-917-01	MOTOR ASSY, L (LOADING)	

5-2. ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u:μ, for example:
  uA..: μA.. uPA..: μPA..
  uPB..: μPB.. uPC..: μPC.. uPD..: μPD..
- CAPACITORS
  uF: μF
- COILS
  uH: μH

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description	Remark
*	A-6727-550-A	HI-2 BOARD, COMPLETE (436EE)	
		*********************	
*	A-6727-556-A	HI-2 BOARD, COMPLETE (X711)	
		*********************	
*	A-6727-551-A	HI-3 BOARD, COMPLETE (286EE)	
		*********************	
*	A-6727-555-A	HI-3 BOARD, COMPLETE (X311)	
		*********************	
		(Ref. No. 3,000Series)	
*	3-957-206-01	HOLDER, LCD	
*	3-957-230-01	ILLUMINATOR	
	3-697-607-01	HOLDER, LED	
*	3-957-904-01	REFLECTOR, LCD	
		< CAPACITOR >	
C001	1-124-584-00	ELECT 100uF 20% 10V	
C004	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C005	1-126-157-11	ELECT 10uF 20% 16V	
C006	1-124-584-00	ELECT 100uF 20% 10V	
		< FILTER >	
CF001	1-577-101-11	VIBRATOR, CERAMIC	
		< CONNECTOR >	
CN001	1-695-820-11	CONNECTOR, BOARD TO BOARD 12P	
CN002	1-569-264-11	CONNECTOR, FPC (ZIF TYPE) 8P	
		< DIODE >	
D001	8-719-911-19	DIODE 1SS119 (436EE/X711)	
D001	8-719-404-46	DIODE MA110 (286EE/X311)	
D002	8-719-911-19	DIODE 1SS119 (436EE/X711)	
D002	8-719-404-46	DIODE MA110 (286EE/X311)	
D003	8-719-911-19	DIODE 1SS119 (436EE/X711)	
D003	8-719-404-46	DIODE MA110 (286EE/X311)	
D004	8-719-911-19	DIODE 1SS119	
D005	8-719-940-99	LED SLR34VC3	
D006	8-719-940-99	LED SLR34VC3	
D007	8-719-047-06	DIODE SEL3713K-TP5	
D008	8-719-047-06	DIODE SEL3713K-TP5	
D009	8-719-047-06	DIODE SEL3713K-TP5	
D010	8-719-047-06	DIODE SEL3713K-TP5	
D011	8-719-109-93	DIODE RD6.2ES-B2 (436EE/X711)	
D011	8-719-157-33	DIODE RD6.2M-B (286EE/X311)	
D012	8-719-109-93	DIODE RD6.2ES-B2	
D012	8-719-157-33	DIODE RD6.2M-B (286EE/X311)	
D013	8-719-109-93	DIODE RD6.2ES-B2	
D014	8-719-109-93	DIODE RD6.2ES-B2 (436EE/X711)	
D015	8-719-109-93	DIODE RD6.2ES-B2	
D016	8-719-109-93	DIODE RD6.2ES-B2	
D017	8-719-109-93	DIODE RD6.2ES-B2	
D018	8-719-109-93	DIODE RD6.2ES-B2	
		< IC >	
IC001	8-759-199-25	IC uPD75304GF-337-3B9	
		< JUMPER RESISTOR >	
JR001	1-216-295-00	METAL CHIP 0 5% 1/10W	(436EE/X711)
JR002	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR003	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR004	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR005	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR006	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR007	1-216-295-00	METAL CHIP 0 5% 1/10W	(286EE/X311)
JR007	1-216-296-00	METAL GLAZE 0 5% 1/8W	(436EE/X711)
JR010	1-216-296-00	METAL GLAZE 0 5% 1/8W	(436EE/X711)
		< COIL >	
L001	1-410-526-11	INDUCTOR 10uH	
		< LIQUID CRYSTAL DISPLAY >	
LCD001	1-810-409-11	DISPLAY PANEL, LIQUID CRYSTAL	(X311/X711)
LCD001	1-810-409-21	DISPLAY PANEL, LIQUID CRYSTAL	(286EE/436EE)

Ref. No.	Part No.	Description			Remark
		< PILOT LAMP >			
PL001	1-517-254-11	LAMP, PILOT			
PL002	1-517-254-11	LAMP, PILOT			
PL003	1-517-254-11	LAMP, PILOT			
		< TRANSISTOR >			
Q002	8-729-902-99	TRANSISTOR DTC114TK			
Q003	8-729-018-99	TRANSISTOR 2SD2394-F			
Q004	8-729-422-37	TRANSISTOR 2SB709A-R			
		< RESISTOR >			
R005	1-216-025-00	METAL CHIP	100	5%	1/10W
R006	1-216-025-00	METAL CHIP	100	5%	1/10W (286EE/X311)
R006	1-247-807-31	CARBON	100	5%	1/4W (436EE/X711)
R007	1-216-025-00	METAL CHIP	100	5%	1/10W (286EE/X311)
R007	1-247-807-31	CARBON	100	5%	1/4W (436EE/X711)
R008	1-247-807-31	CARBON	100	5%	1/4W
R009	1-247-807-31	CARBON	100	5%	1/4W
R010	1-247-807-31	CARBON	100	5%	1/4W
R011	1-216-025-00	METAL CHIP	100	5%	1/10W
R012	1-216-025-00	METAL CHIP	100	5%	1/10W
R013	1-216-025-00	METAL CHIP	100	5%	1/10W (436EE/X711)
R013	1-247-807-31	CARBON	100	5%	1/4W (286EE/X311)
R014	1-216-025-00	METAL CHIP	100	5%	1/10W (436EE/X711)
R014	1-247-807-31	CARBON	100	5%	1/4W (286EE/X311)
R015	1-216-025-00	METAL CHIP	100	5%	1/10W (286EE/X311)
R015	1-216-174-00	METAL GLAZE	100	5%	1/8W (436EE/X711)
R020	1-216-025-00	METAL CHIP	100	5%	1/10W (286EE/X311)
R020	1-216-174-00	METAL GLAZE	100	5%	1/8W (436EE/X711)
R021	1-216-174-00	METAL GLAZE	100	5%	1/8W (436EE/X711)
R021	1-247-807-31	CARBON	100	5%	1/4W (286EE/X311)
R023	1-249-411-11	CARBON	330	5%	1/4W
R024	1-249-411-11	CARBON	330	5%	1/4W
R036	1-249-409-11	CARBON	220	5%	1/4W F
R038	1-216-222-00	METAL GLAZE	10K	5%	1/8W

Ref. No.	Part No.	Description			Remark
R039	1-216-172-00	METAL CHIP	82	5%	1/8W
R040	1-216-172-00	METAL CHIP	82	5%	1/8W
R041	1-249-409-11	CARBON	220	5%	1/4W F
R042	1-216-049-00	METAL CHIP	1K	5%	1/10W
R043	1-216-049-00	METAL CHIP	1K	5%	1/10W
R044	1-216-049-00	METAL CHIP	1K	5%	1/10W
R045	1-216-049-00	METAL CHIP	1K	5%	1/10W
R046	1-216-049-00	METAL CHIP	1K	5%	1/10W
R047	1-216-057-00	METAL CHIP	2.2K	5%	1/10W (436EE/X711)
R047	1-249-421-11	CARBON	2.2K	5%	1/4W F (286EE/X311)
R048	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
		< SWITCH >			
S001	1-571-977-11	SWITCH, TACTIL (PAUSE)			
S002	1-692-840-21	SWITCH, ROTARY			

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Ref. No.	Part No.	Description
*	A-6782-285-A	MA-203 BOARD, COMPLETE (X711:NZ) **********************
*	A-6782-286-A	MA-203 BOARD, COMPLETE (X711:AS) **********************
*	A-6782-287-A	MA-203 BOARD, COMPLETE (436EE) **********************
*	A-6782-288-A	MA-203 BOARD, COMPLETE (X311) **********************
*	A-6782-289-A	MA-203 BOARD, COMPLETE (X711:ME, SG, PS) **********************
*	A-6782-290-A	MA-203 BOARD, COMPLETE (286EE) **********************

(Ref. No. 2,000Series)

Ref. No.	Part No.	Description				Remark
*	1-533-293-11	FUSE HOLDER				
	1-568-185-21	JACK, PIN 4P				
		< CAPACITOR >				
⚠C101	1-104-705-11	FILM	0.1uF	20%	250V	(X311/X711:ME, SG, PS)
⚠C101	1-104-706-11	FILM	0.22uF	20%	250V	(286EE/436EE/X711:NZ, AS)
⚠C102	1-104-705-11	FILM	0.1uF	20%	250V	
⚠C103	1-107-405-11	ELECT	68uF	20%	400V	(286EE/436EE/X711:NZ, AS)
⚠C103	1-107-414-11	ELECT	220uF	20%	400V	(X311/X711:ME, SG, PS)
⚠C104	1-161-741-00	CERAMIC	0.001uF	10%	400V	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
⚠C105	1-161-741-00	CERAMIC	0.001uF	10%	400V
⚠C106	1-161-741-00	CERAMIC	0.001uF	10%	400V
⚠C107	1-161-741-00	CERAMIC	0.001uF	10%	400V
⚠C108	1-161-741-00	CERAMIC	0.001uF	10%	400V
C121	1-124-480-11	ELECT	470uF	20%	25V
C122	1-124-472-11	ELECT	470uF	20%	10V
C123	1-126-101-11	ELECT	100uF	20%	16V
C124	1-124-589-11	ELECT	47uF	20%	16V
C125	1-124-477-11	ELECT	47uF	20%	25V
C126	1-124-477-11	ELECT	47uF	20%	25V
C181	1-124-589-11	ELECT	47uF	20%	16V
C182	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C183	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C184	1-124-907-11	ELECT	10uF	20%	50V
C185	1-124-907-11	ELECT	10uF	20%	50V
C186	1-124-907-11	ELECT	10uF	20%	50V
C187	1-124-907-11	ELECT	10uF	20%	50V
C301	1-104-695-11	FILM	330PF	5%	100V
C302	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C303	1-104-696-11	FILM	0.015uF	5%	100V
C304	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C305	1-124-120-11	ELECT	220uF	20%	25V
C306	1-124-242-00	ELECT	33uF	20%	25V
C307	1-124-034-51	ELECT	33uF	20%	16V
C308	1-163-023-00	CERAMIC CHIP	0.015uF	5%	50V
C309	1-126-160-11	ELECT	1uF	20%	50V
C310	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C311	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C312	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C313	1-124-465-00	ELECT	0.47uF	20%	50V
C314	1-124-261-00	ELECT	10uF	20%	50V
C315	1-130-483-00	MYLAR	0.01uF	5%	50V
C316	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C317	1-126-301-11	ELECT	1uF	20%	50V
C319	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C320	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C321	1-126-157-11	ELECT	10uF	20%	16V
C322	1-124-257-00	ELECT	2.2uF	20%	50V
C323	1-163-007-11	CERAMIC CHIP	680PF	10%	50V
C401	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C402	1-126-101-11	ELECT	100uF	20%	16V
C403	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C404	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C405	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C406	1-124-261-00	ELECT	10uF	20%	50V
C407	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C408	1-124-598-11	ELECT	22uF	20%	25V
C409	1-163-031-11	CERAMIC CHIP	0.01uF		50V

Ref. No.	Part No.	Description			Remark
C410	1-124-598-11	ELECT	22uF	20%	25V
C411	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C412	1-130-486-00	MYLAR	0.018uF	10%	50V
C413	1-130-485-00	MYLAR	0.015uF	5%	50V
					(286EE/X311)
C413	1-130-489-00	MYLAR	0.033uF	5%	50V
					(436EE/X711)
C414	1-126-163-11	ELECT	4.7uF	20%	50V
C415	1-124-261-00	ELECT	10uF	20%	50V
C416	1-124-257-00	ELECT	2.2uF	20%	50V
					(286EE/X311)
C417	1-124-589-11	ELECT	47uF	20%	16V
C418	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C419	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C420	1-126-177-11	ELECT	100uF	20%	10V
C421	1-124-598-11	ELECT	22uF	20%	25V
C422	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C423	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C425	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C426	1-124-257-00	ELECT	2.2uF	20%	50V
C427	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C428	1-126-301-11	ELECT	1uF	20%	50V
					(286EE/X311)
C429	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
					(286EE/X311)
C430	1-126-163-11	ELECT	4.7uF	20%	50V
C431	1-124-589-11	ELECT	47uF	20%	16V
C432	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C440	1-124-907-11	ELECT	10uF	20%	50V
C470	1-124-261-00	ELECT	10uF	20%	50V
C480	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C481	1-102-948-00	CERAMIC	11PF	5%	50V
C501	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C502	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C503	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C505	1-126-177-11	ELECT	100uF	20%	10V
C506	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C507	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C508	1-104-905-11	CAP, DOUBLE LAYERS 0.22F			
C509	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C510	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C511	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C512	1-124-472-11	ELECT	470uF	20%	10V
C513	1-124-589-11	ELECT	47uF	20%	16V
C514	1-165-319-11	CERAMIC CHIP	0.1uF		50V
C515	1-124-589-11	ELECT	47uF	20%	16V
					(436EE/X711)
C516	1-163-031-11	CERAMIC CHIP	0.01uF		50V
					(436EE/X711)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

MA-203

Ref. No.	Part No.	Description			Remark
C519	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C520	1-124-589-11	ELECT	47uF	20%	16V
C522	1-163-031-11	CERAMIC CHIP	0.01uF		50V
					(436EE/X711)
C524	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C550	1-163-189-00	CERAMIC CHIP	220PF	10%	50V
C601	1-126-154-11	ELECT	47uF	20%	6.3V
C602	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C603	1-163-234-11	CERAMIC CHIP	20PF	5%	50V
C604	1-163-234-11	CERAMIC CHIP	20PF	5%	50V
C606	1-126-157-11	ELECT	10uF	20%	16V
C607	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C608	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C609	1-126-154-11	ELECT	47uF	20%	6.3V
C610	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C615	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
					(286EE/436EE/X711:ME, SG, PS)
C616	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
					(286EE/436EE/X711:ME, SG, PS)
C617	1-163-119-00	CERAMIC CHIP	120PF	5%	50V
C618	1-126-160-11	ELECT	1uF	20%	50V
C620	1-130-481-00	MYLAR	0.0068uF	5%	50V
C621	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C622	1-130-487-00	MYLAR	0.022uF	5%	50V
C623	1-124-465-00	ELECT	0.47uF 4	20%	50V
C624	1-163-102-00	CERAMIC CHIP	24PF	5%	50V
C625	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C627	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C630	1-126-154-11	ELECT	47uF	20%	6.3V
C703	1-124-126-00	ELECT	47uF	20%	10V
C705	1-124-443-00	ELECT	100uF	20%	10V
C706	1-124-927-11	ELECT	4.7uF	20%	100V
C707	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C709	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C711	1-126-101-11	ELECT	100uF	20%	16V
C717	1-124-261-00	ELECT	10uF	20%	50V
C722	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C725	1-124-472-11	ELECT	470uF	20%	10V
C726	1-124-477-11	ELECT	47uF	20%	25V
C732	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C756	1-162-286-31	CERAMIC	220PF	10%	50V
C801	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C852	1-124-638-11	ELECT	22uF	20%	10V
C853	1-126-154-11	ELECT	47uF	20%	6.3V
C854	1-124-638-11	ELECT	22uF	20%	10V
		< CONNECTOR >			
⚠CN101	1-251-134-11	INLET, AC (NONPOLAR) (AC IN)			
* CN301	1-560-891-00	PIN, CONNECTOR 3P			
* CN302	1-560-892-00	PIN, CONNECTOR 4P			
* CN303	1-560-891-00	PIN, CONNECTOR 3P			
CN402	1-691-057-21	HOUSING, CONNECTOR 25P			
* CN406	1-560-891-00	PIN, CONNECTOR 3P			
* CN407	1-560-891-00	PIN, CONNECTOR 3P			
* CN501	1-695-823-11	CONNECTOR, BOARD TO BOARD 8P			
CN502	1-695-821-11	CONNECTOR, BOARD TO BOARD 12P			
CN801	1-573-846-11	CONNECTOR, BOARD TO BOARD 14P			
CN802	1-573-852-11	CONNECTOR, BOARD TO BOARD 20P			
		< JACK >			
CNJ01	1-568-185-21	JACK, PIN 4P (LINE IN/OUT)			
		< COMPOSITION CIRCUIT BLOCK >			
⚠CP101	1-413-896-11	POWER BLOCK (X311/X711:ME, SG, PS)			
⚠CP101	1-413-897-11	POWER BLOCK (286EE/436EE/X711:NZ, AS)			
		< TRIMMER >			
CT601	1-141-334-11	CAP, VAR, TRIMMER			
		< DIODE >			
⚠D101	8-719-510-06	DIODE S1WB60			
⚠D121	8-719-200-82	DIODE 11ES2			
D122	8-719-109-85	DIODE RD5.1ES-B2			
D123	8-719-911-19	DIODE 1SS119			
D181	8-719-911-19	DIODE 1SS119			
D182	8-719-911-19	DIODE 1SS119			
D183	8-719-911-19	DIODE 1SS119			
D184	8-719-911-19	DIODE 1SS119			
D301	8-719-911-19	DIODE 1SS119			
D302	8-719-911-19	DIODE 1SS119			
D304	8-719-911-19	DIODE 1SS119			
D351	8-719-109-85	DIODE RD5.1ES-B2 (286EE/X311)			
D401	8-719-911-19	DIODE 1SS119			
D402	8-719-101-50	DIODE RD5.1E-L2			
D450	8-719-109-93	DIODE RD6.2ES-B2			
D501	8-719-911-19	DIODE 1SS119			
⚠D502	8-719-200-82	DIODE 11ES2			
⚠D503	8-719-200-82	DIODE 11ES2			
D551	8-719-911-19	DIODE 1SS119			
D601	8-719-911-19	DIODE 1SS119			
D603	8-719-911-19	DIODE 1SS119			
⚠D703	8-719-800-76	DIODE 1SS226			
D704	8-719-110-78	DIODE RD33ES-B2			
D705	8-719-109-74	DIODE RD4.3ES-B1			
D720	8-719-109-85	DIODE RD5.1ES-B2			

The components identified by
mark ⚠ or dotted line with mark
⚠ are critical for safety.
Replace only with part number
specified.

< FUSE >

Ref. No.	Part No.	Description	Remark
⚠F101	1-576-228-11	FUSE (H. B. C.) (T2A 250V)	

< IC >

Ref. No.	Part No.	Description	Remark
⚠IC121	8-759-189-48	IC PQ12RE11	
⚠IC181	8-759-189-47	IC MC34151DR2	
IC301	8-759-089-82	IC BA7790LS	
⚠IC401	8-759-249-94	IC BA6888N	
IC402	8-759-100-95	IC uPC324G2	
IC402	8-759-983-74	IC LM324NS	(286EE)
IC403	8-759-908-17	IC TL082CPS	
IC404	8-759-745-64	IC NJM4560M	
IC405	8-759-100-94	IC uPC358G2	(286EE/X311)
IC406	8-759-246-14	IC TA8823N	
IC501	8-752-848-78	IC CXP87248-012Q	(286EE/X311)
IC501	8-752-848-79	IC CXP87248-013Q	(436EE/X711)
IC504	8-759-044-78	IC AK6420F-SGX2060	
IC505	8-759-097-80	IC HD49783FP	(436EE/X711)
IC507	8-759-248-87	IC MM1256XF-BE	
IC601	8-759-252-52	IC LC74790M-9	
IC801	8-759-927-56	IC BA7021	

< JUMPER RESISTOR >

Ref. No.	Part No.	Description	Remark
JR001	1-216-296-00	METAL GLAZE 0 5% 1/8W	(286EE/X311)
JR001	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR002	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR003	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR004	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR005	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR006	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR007	1-216-296-00	METAL GLAZE 0 5% 1/8W	(436EE/X711)
JR008	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR009	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR010	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR011	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR012	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR013	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR014	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR401	1-216-295-00	METAL CHIP 0 5% 1/10W	(436EE/X711)
JR402	1-216-295-00	METAL CHIP 0 5% 1/10W	(436EE/X711)
JR503	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR603	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR604	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR704	1-216-295-00	METAL CHIP 0 5% 1/10W	(286EE/436EE/X311/X711:ME, SG, PS)
JR705	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR706	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR904	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR905	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR907	1-216-295-00	METAL CHIP 0 5% 1/10W	(436EE)
JR908	1-216-295-00	METAL CHIP 0 5% 1/10W	(286EE/X311/X711)
JR909	1-216-295-00	METAL CHIP 0 5% 1/10W	(436EE)
JR910	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR914	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR915	1-216-296-00	METAL GLAZE 0 5% 1/8W	
JR922	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR923	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR925	1-216-295-00	METAL CHIP 0 5% 1/10W	(436EE)
JR931	1-216-295-00	METAL CHIP 0 5% 1/10W	(286EE/X311)
JR948	1-216-295-00	METAL CHIP 0 5% 1/10W	

< COIL >

Ref. No.	Part No.	Description	Remark
L111	1-414-179-21	INDUCTOR 2.2uH	
L121	1-403-588-11	CIL, CHOKE 22uH	
L122	1-403-588-11	CIL, CHOKE 22uH	
L123	1-408-421-00	INDUCTOR 100uH	
L181	1-410-527-11	INDUCTOR 100uH	
L301	1-410-687-11	INDUCTOR 1.2mH	
L302	1-414-189-31	INDUCTOR 100uH	
L303	1-410-071-11	INDUCTOR 10mH	
L401	1-408-413-00	INDUCTOR 22uH	
L402	1-408-413-00	INDUCTOR 22uH	
L501	1-414-183-41	INDUCTOR 10uH	
L502	1-414-189-31	INDUCTOR 100uH	(436EE/X711)
L503	1-414-183-41	INDUCTOR 10uH	
L504	1-414-183-41	INDUCTOR 10uH	
L601	1-414-189-31	INDUCTOR 100uH	
L602	1-414-189-31	INDUCTOR 100uH	
L603	1-410-513-11	INDUCTOR 22uH	(436EE/X711:ME, SG, PS)
L604	1-410-506-11	INDUCTOR 5.6uH	
L605	1-410-527-11	INDUCTOR 100uH	
L701	1-414-183-41	INDUCTOR 10uH	
L702	1-414-186-31	INDUCTOR 33uH	
L706	1-408-401-00	INDUCTOR 2.2uH	
L707	1-408-401-00	INDUCTOR 2.2uH	
L708	1-414-189-31	INDUCTOR 100uH	
L712	1-410-500-11	INDUCTOR 1.8uH	
L801	1-414-189-31	INDUCTOR 100uH	

< LINE FILTER >

Ref. No.	Part No.	Description	Remark
⚠LF101	1-403-599-11	FILTER, LINE 33MH	(286EE/436EE/X711:NZ, AS)
⚠LF101	1-424-117-11	FILTER, LINE	(X311/X711:ME, SG, PS)
⚠LF102	1-403-599-11	FILTER, LINE 33MH	(286EE/436EE/X711:NZ, AS)
⚠LF102	1-424-117-11	FILTER, LINE	(X311/X711:ME, SG, PS)
LF181	1-239-803-11	FILTER, EMI	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

MA-203

Ref. No.	Part No.	Description				Remark
		< IC LINK >				
⚠PS121	1-532-675-00	LINK, IC 1.5A				
⚠PS181	1-532-679-00	LINK, IC				
⚠PS301	1-532-727-11	LINK, IC 0.25A				
⚠PS401	1-532-679-00	LINK, IC				
⚠PS450	1-532-727-11	LINK, IC 0.25A				
		< TRANSISTOR >				
⚠Q121	8-729-140-93	TRANSISTOR	2SB733-34			
Q122	8-729-421-22	TRANSISTOR	UN2211			
⚠Q123	8-729-140-98	TRANSISTOR	2SD773-34			
Q301	8-729-012-31	TRANSISTOR	2SC4040-TL2-Q			
Q302	8-729-216-22	TRANSISTOR	2SA1162-G			
Q303	8-729-010-25	TRANSISTOR	MSD601-RT1			
Q304	8-729-010-05	TRANSISTOR	MSB709-RT1			
Q305	8-729-010-25	TRANSISTOR	MSD601-RT1			
Q401	8-729-424-56	TRANSISTOR	UN211L			
Q501	8-729-424-18	TRANSISTOR	UN2113 (436EE/X711)			
Q505	8-729-424-18	TRANSISTOR	UN2113 (436EE/X711)			
Q570	8-729-424-18	TRANSISTOR	UN2113 (436EE/X711)			
Q601	8-729-424-18	TRANSISTOR	UN2113			
Q602	8-729-010-25	TRANSISTOR	MSD601-RT1			
Q604	8-729-010-05	TRANSISTOR	MSB709-RT1			
Q605	8-729-010-05	TRANSISTOR	MSB709-RT1			
Q630	8-729-010-25	TRANSISTOR	MSD601-RT1			
⚠Q703	8-729-119-76	TRANSISTOR	2SA1175-HFE			
Q712	8-729-119-76	TRANSISTOR	2SA1175-HFE			
		< RESISTOR >				
⚠R101	1-214-947-00	METAL	2.7M	1%	1/2W	
R121	1-249-417-11	CARBON	1K	5%	1/4W	F
⚠R122	1-216-430-11	METAL OXIDE	390	5%	1W	F
R123	1-249-412-11	CARBON	390	5%	1/4W	F
R181	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R182	1-216-073-00	METAL CHIP	10K	5%	1/10W	
⚠R301	1-249-389-11	CARBON	4.7	5%	1/4W	F
R302	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R303	1-249-417-11	CARBON	1K	5%	1/4W	F
R304	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R305	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R306	1-216-089-91	METAL GLAZE	47K	5%	1/10W	
R307	1-216-068-00	METAL CHIP	6.2K	5%	1/10W	
R308	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R309	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R310	1-216-037-00	METAL CHIP	330	5%	1/10W	
R311	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R312	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R313	1-216-041-00	METAL CHIP	470	5%	1/10W	
R314	1-216-095-00	METAL CHIP	82K	5%	1/10W	
R315	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R316	1-216-035-00	METAL CHIP	270	5%	1/10W	
R317	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R318	1-216-074-00	METAL CHIP	11K	5%	1/10W	
R319	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R320	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R321	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R322	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R323	1-216-129-00	METAL CHIP	2.2M	5%	1/10W	
R325	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R326	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R327	1-216-068-00	METAL CHIP	6.2K	5%	1/10W	
R328	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R331	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R332	1-216-089-91	METAL GLAZE	47K	5%	1/10W	
R333	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R334	1-216-095-00	METAL CHIP	82K	5%	1/10W	
R335	1-216-234-00	METAL GLAZE	33K	5%	1/8W	
R336	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R337	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R363	1-216-001-00	METAL CHIP	10	5%	1/10W	
R401	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R402	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R403	1-216-033-00	METAL CHIP	220	5%	1/10W	
R404	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R405	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R406	1-216-089-91	METAL GLAZE	47K	5%	1/10W	
R407	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R408	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R409	1-216-089-91	METAL GLAZE	47K	5%	1/10W	
R410	1-216-675-11	METAL CHIP	10K	0.5%	1/10W	
R411	1-216-667-11	METAL CHIP	4.7K	0.5%	1/10W	
R412	1-216-673-11	METAL CHIP	8.2K	0.5%	1/10W	
R413	1-216-671-11	METAL CHIP	6.8K	0.5%	1/10W	
R414	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R415	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R416	1-216-103-91	METAL GLAZE	180K	5%	1/10W	
R417	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R418	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R419	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R420	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R421	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R422	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R423	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R424	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R425	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R426	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R427	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R428	1-216-073-00	METAL CHIP	10K	5%	1/10W	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
R429	1-216-073-00	METAL CHIP	10K	5%	1/10W
R430	1-216-117-00	METAL CHIP	680K	5%	1/10W (286EE/X311)
R431	1-216-077-00	METAL CHIP	15K	5%	1/10W (286EE/X311)
R432	1-216-081-00	METAL CHIP	22K	5%	1/10W (286EE/X311)
R433	1-216-101-00	METAL CHIP	150K	5%	1/10W (286EE/X311)
R434	1-216-089-91	METAL GLAZE	47K	5%	1/10W (286EE/X311)
R435	1-216-093-00	METAL CHIP	68K	5%	1/10W
R436	1-216-119-00	METAL CHIP	820K	5%	1/10W
R437	1-216-097-00	METAL CHIP	100K	5%	1/10W
R438	1-216-097-00	METAL CHIP	100K	5%	1/10W
R439	1-216-085-00	METAL CHIP	33K	5%	1/10W
R440	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R441	1-216-037-00	METAL CHIP	330	5%	1/10W
R443	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R444	1-216-049-00	METAL CHIP	1K	5%	1/10W (286EE/X311)
R445	1-216-117-00	METAL CHIP	680K	5%	1/10W (286EE/X311)
R446	1-216-075-00	METAL CHIP	12K	5%	1/10W (286EE/X311)
R447	1-216-073-00	METAL CHIP	10K	5%	1/10W (286EE/X311)
R448	1-216-073-00	METAL CHIP	10K	5%	1/10W
R449	1-216-091-00	METAL CHIP	56K	5%	1/10W
R450	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R451	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R453	1-216-091-00	METAL CHIP	56K	5%	1/10W
R454	1-249-414-11	CARBON	560	5%	1/4W F
R455	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R456	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R457	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R458	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R459	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R460	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R461	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R462	1-216-103-91	METAL GLAZE	180K	5%	1/10W
R470	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R471	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R501	1-216-001-00	METAL CHIP	10	5%	1/10W
R502	1-216-081-00	METAL CHIP	22K	5%	1/10W
R503	1-216-049-00	METAL CHIP	1K	5%	1/10W
R505	1-216-049-00	METAL CHIP	1K	5%	1/10W
R506	1-216-049-00	METAL CHIP	1K	5%	1/10W
R507	1-216-033-00	METAL CHIP	220	5%	1/10W
R508	1-249-437-11	CARBON	47K	5%	1/4W
R509	1-249-437-11	CARBON	47K	5%	1/4W
R510	1-216-049-00	METAL CHIP	1K	5%	1/10W
R511	1-216-025-00	METAL CHIP	100	5%	1/10W
R512	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R513	1-216-025-00	METAL CHIP	100	5%	1/10W
R517	1-216-073-00	METAL CHIP	10K	5%	1/10W (X711:NZ)
R517	1-216-089-91	METAL GLAZE	47K	5%	1/10W (286EE/436EE/X311/X711:ME.SG.PS)
R518	1-216-089-91	METAL GLAZE	47K	5%	1/10W (X711:NZ.AS)
R521	1-216-150-00	METAL GLAZE	10	5%	1/8W
R522	1-216-109-00	METAL CHIP	330K	5%	1/10W
R523	1-216-113-00	METAL CHIP	470K	5%	1/10W
R524	1-216-105-00	METAL CHIP	220K	5%	1/10W
R526	1-216-063-00	METAL CHIP	3.9K	5%	1/10W (436EE/X711)
R527	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (436EE/X711)
R528	1-216-069-00	METAL CHIP	6.8K	5%	1/10W (436EE/X711)
R529	1-216-061-00	METAL CHIP	3.3K	5%	1/10W (436EE/X711)
R530	1-216-061-00	METAL CHIP	3.3K	5%	1/10W (436EE/X711)
R531	1-216-061-00	METAL CHIP	3.3K	5%	1/10W (436EE/X711)
R532	1-216-069-00	METAL CHIP	6.8K	5%	1/10W (436EE/X711)
R533	1-216-069-00	METAL CHIP	6.8K	5%	1/10W (436EE/X711)
R534	1-216-069-00	METAL CHIP	6.8K	5%	1/10W (436EE/X711)
R535	1-216-069-00	METAL CHIP	6.8K	5%	1/10W (436EE/X711)
R536	1-216-049-00	METAL CHIP	1K	5%	1/10W
R537	1-216-049-00	METAL CHIP	1K	5%	1/10W
R538	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R542	1-216-295-00	METAL CHIP	0	5%	1/10W (436EE/X711)
R543	1-216-073-00	METAL CHIP	10K	5%	1/10W (436EE/X711)
R544	1-216-295-00	METAL CHIP	0	5%	1/10W
R546	1-216-049-00	METAL CHIP	1K	5%	1/10W
R547	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R550	1-216-295-00	METAL CHIP	0	5%	1/10W
R551	1-216-295-00	METAL CHIP	0	5%	1/10W
R552	1-216-295-00	METAL CHIP	0	5%	1/10W

MA-203 MF-249

Ref. No.	Part No.	Description			Remark
R553	1-216-295-00	METAL CHIP	0	5%	1/10W
R554	1-216-295-00	METAL CHIP	0	5%	1/10W
R560	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R561	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R570	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (436EE/X711)
R605	1-216-073-00	METAL CHIP	10K	5%	1/10W
R606	1-216-073-00	METAL CHIP	10K	5%	1/10W
R607	1-216-222-00	METAL GLAZE	10K	5%	1/8W
R608	1-216-066-00	METAL CHIP	5.1K	5%	1/10W
R609	1-216-066-00	METAL CHIP	5.1K	5%	1/10W
R613	1-216-295-00	METAL CHIP	0	5%	1/10W
R614	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R615	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R616	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R617	1-216-049-00	METAL CHIP	1K	5%	1/10W
R618	1-216-045-00	METAL CHIP	680	5%	1/10W
R619	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R620	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R621	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R622	1-216-049-00	METAL CHIP	1K	5%	1/10W (286EE/436EE/X311/X711:ME, SG, PS)
R623	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R630	1-216-049-00	METAL CHIP	1K	5%	1/10W
R704	1-216-025-00	METAL CHIP	100	5%	1/10W
R705	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R706	1-216-025-00	METAL CHIP	100	5%	1/10W
R716	1-216-295-00	METAL CHIP	0	5%	1/10W
R719	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R730	1-216-021-00	METAL CHIP	68	5%	1/10W
R731	1-247-811-31	CARBON	150	5%	1/4W
R732	1-216-017-00	METAL CHIP	47	5%	1/10W
R733	1-249-408-11	CARBON	180	5%	1/4W F
R733	1-247-893-11	CARBON	390K	5%	1/4W (286EE)
R734	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R735	1-216-023-00	METAL CHIP	82	5%	1/10W
R738	1-216-043-00	METAL CHIP	560	5%	1/10W
R801	1-216-073-00	METAL CHIP	10K	5%	1/10W
R802	1-216-073-00	METAL CHIP	10K	5%	1/10W
R804	1-216-073-00	METAL CHIP	10K	5%	1/10W

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description	Remark
RV301	1-238-019-11	RES, ADJ, CARBON 47K	
RV502	1-238-019-11	RES, ADJ, CARBON 47K	

< SWITCH >

Ref. No.	Part No.	Description	Remark
SW701	1-571-588-11	SWITCH, SLIDE (TV SYSTEM)	(286EE/436EE/X311/X711:ME, SG, PS)

< TRANSFORMER >

Ref. No.	Part No.	Description	Remark
T301	1-423-414-11	TRANSFORMER, BIAS OSCILLATION	

< TUNER >

Ref. No.	Part No.	Description	Remark
⚠TU701	1-693-239-11	TUNER, RF MOD/IF	

< VIBRATOR >

Ref. No.	Part No.	Description	Remark
X501	1-760-239-11	VIBRATOR, CRYSTAL (16MHz)	
X502	1-579-463-11	VIBRATOR, CRYSTAL (32.768KHz)	
X601	1-577-289-11	VIBRATOR, CRYSTAL	

****

* A-6721-600-A MF-249 BOARD, COMPLETE (436EE/X711)

****

* A-6721-602-A MF-249 BOARD, COMPLETE (286EE/X311)

****

(Ref. No. 3,000Series)

< CONNECTOR >

Ref. No.	Part No.	Description	Remark
* CN001	1-695-822-11	CONNECTOR, BOARD TO BOARD 8P	(436EE/X711)
* CN002	1-695-822-11	CONNECTOR, BOARD TO BOARD 8P	(286EE/X311)

< DIODE >

Ref. No.	Part No.	Description	Remark
D001	8-719-940-82	LED SLR34MC3	
D002	8-719-940-82	LED SLR34MC3	
D004	8-719-109-93	DIODE RD6.2ES-B2	
D006	8-719-109-93	DIODE RD6.2ES-B2	
D007	8-719-109-93	DIODE RD6.2ES-B2	
D008	8-719-109-93	DIODE RD6.2ES-B2	

< IC >

Ref. No.	Part No.	Description	Remark
IC001	1-466-833-11	IC RAY-CATCHER BLOCK, REMOCON	

< TRANSISTOR >

Ref. No.	Part No.	Description	Remark
Q001	8-729-421-22	TRANSISTOR UN2211	

< RESISTOR >

Ref. No.	Part No.	Description			Remark
R001	1-216-021-00	METAL CHIP	68	5%	1/10W

< SWITCH >

Ref. No.	Part No.	Description	Remark
S001	1-571-977-11	SWITCH, TACTIL (POWER)	
S002	1-571-977-11	SWITCH, TACTIL (EJECT)	

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The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
*	A-6727-516-A	MH-11 BOARD, COMPLETE (436EE/X711)	
		**********************	
*	A-6727-552-A	MH-12 BOARD, COMPLETE (286EE/X311)	
		**********************	
		(Ref. No. 1,000Series)	
		< CONNECTOR >	
CN301	1-764-271-31	CONNECTOR, BOARD TO BOARD 9P	
CN302	1-764-272-31	CONNECTOR, BOARD TO BOARD 13P	
CN303	1-564-014-11	PIN, CONNECTOR 4P	
CN304	1-691-084-21	HOUSING, CONNECTOR 25P	

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Ref. No.	Part No.	Description	Remark
*	A-6721-599-A	RV-33 BOARD, COMPLETE (X711:NZ, AS)	
		**********************	
*	A-6721-601-A	RV-33 BOARD, COMPLETE	
		**********************	
		(436EE/X711:ME, SG, PS)	
*	A-6721-603-A	RV-33 BOARD, COMPLETE (286EE/X311)	
		**********************	
		(Ref. No. 1,000Series)	
		< CAPACITOR >	
C001	1-163-989-11	CERAMIC CHIP 0.033uF 10% 25V	
C002	1-164-699-11	CERAMIC CHIP 0.0033uF 5% 50V	
C003	1-124-465-00	ELECT 0.47uF 20% 50V	
C004	1-163-099-00	CERAMIC CHIP 18PF 5% 50V	
C005	1-163-108-00	CERAMIC CHIP 43PF 5% 50V	
C006	1-124-257-00	ELECT 2.2uF 20% 50V	
C007	1-163-235-11	CERAMIC CHIP 22PF 5% 50V	
C008	1-163-237-11	CERAMIC CHIP 27PF 5% 50V	
C009	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C010	1-163-037-11	CERAMIC CHIP 0.022uF 10% 25V	
C011	1-124-463-00	ELECT 0.1uF 20% 50V	
C012	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C013	1-164-161-11	CERAMIC CHIP 0.0022uF 10% 100V	
C014	1-124-465-00	ELECT 0.47uF 20% 50V	
C015	1-164-161-11	CERAMIC CHIP 0.0022uF 10% 100V	
C016	1-163-095-00	CERAMIC CHIP 12PF 5% 50V	
C017	1-163-083-00	CERAMIC CHIP 1PF 50V	
C018	1-126-163-11	ELECT 4.7uF 20% 50V	
C019	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C020	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C022	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C024	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C025	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C026	1-126-157-11	ELECT 10uF 20% 16V	
C027	1-163-099-00	CERAMIC CHIP 18PF 5% 50V	
C028	1-163-229-11	CERAMIC CHIP 12PF 5% 50V	
C029	1-124-465-00	ELECT 0.47uF 20% 50V	
C030	1-163-035-00	CERAMIC CHIP 0.047uF 50V	
C031	1-124-638-11	ELECT 22uF 20% 10V	
C032	1-126-162-11	ELECT 3.3uF 20% 50V	
C033	1-124-638-11	ELECT 22uF 20% 10V	
C034	1-163-035-00	CERAMIC CHIP 0.047uF 50V	
C036	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C038	1-163-087-00	CERAMIC CHIP 4PF 50V	
C039	1-163-101-00	CERAMIC CHIP 22PF 5% 50V	
C040	1-163-101-00	CERAMIC CHIP 22PF 5% 50V	
C044	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C045	1-124-257-00	ELECT 2.2uF 20% 50V	
C046	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C047	1-164-004-11	CERAMIC CHIP 0.1uF 10% 25V	
C048	1-162-568-11	CERAMIC CHIP 0.33uF 10% 16V	(286EE/X311)
C048	1-163-077-00	CERAMIC CHIP 0.1uF 10% 25V	(436EE/X711)
C049	1-163-107-00	CERAMIC CHIP 39PF 5% 50V	
C050	1-163-123-00	CERAMIC CHIP 180PF 5% 50V	
C051	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C052	1-163-105-00	CERAMIC CHIP 33PF 5% 50V	
C053	1-124-465-00	ELECT 0.47uF 20% 50V	
C055	1-163-109-00	CERAMIC CHIP 47PF 5% 50V	
C056	1-163-139-00	CERAMIC CHIP 820PF 5% 50V	
C057	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C058	1-124-465-00	ELECT 0.47uF 20% 50V	
C059	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C060	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C061	1-163-125-00	CERAMIC CHIP 220PF 5% 50V	
C062	1-163-127-00	CERAMIC CHIP 270PF 5% 50V	
C063	1-163-035-00	CERAMIC CHIP 0.047uF 50V	
C064	1-124-638-11	ELECT 22uF 20% 10V	
C065	1-163-121-00	CERAMIC CHIP 150PF 5% 50V	
C066	1-163-809-11	CERAMIC CHIP 0.047uF 10% 25V	
C067	1-165-320-11	CERAMIC CHIP 0.47uF 10% 16V	
C068	1-163-096-00	CERAMIC CHIP 13PF 5% 50V	
C073	1-163-113-00	CERAMIC CHIP 68PF 5% 50V	
C075	1-163-129-00	CERAMIC CHIP 330PF 5% 50V	
C079	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C081	1-163-091-00	CERAMIC CHIP 8PF 50V	
C082	1-163-227-11	CERAMIC CHIP 10PF 0.5PF 50V	
C083	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C086	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C087	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C093	1-163-104-00	CERAMIC CHIP 30PF 5% 50V	
C098	1-124-638-11	ELECT 22uF 20% 10V	
C099	1-163-031-11	CERAMIC CHIP 0.01uF 50V	

RV-33

Ref. No.	Part No.	Description			Remark
C101	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C102	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C120	1-124-638-11	ELECT	22uF	20%	10V
C121	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C203	1-163-031-11	CERAMIC CHIP	0.01uF		50V (286EE/436EE/X311/X711:ME, SG, PS)
C204	1-126-154-11	ELECT	47uF	20%	6.3V (286EE/436EE/X311/X711:ME, SG, PS)
C205	1-126-163-11	ELECT	4.7uF	20%	50V (286EE/436EE/X311/X711:ME, SG, PS)
C206	1-163-035-00	CERAMIC CHIP	0.047uF		50V (286EE/436EE/X311/X711:ME, SG, PS)
C207	1-124-638-11	ELECT	22uF	20%	10V (286EE/436EE/X311/X711:ME, SG, PS)
C208	1-163-113-00	CERAMIC CHIP	68PF	5%	50V (286EE/436EE/X311/X711:ME, SG, PS)
C209	1-163-031-11	CERAMIC CHIP	0.01uF		50V (286EE/436EE/X311/X711:ME, SG, PS)
C278	1-163-113-00	CERAMIC CHIP	68PF	5%	50V (286EE/436EE/X311/X711:ME, SG, PS)
C702	1-163-031-11	CERAMIC CHIP	0.01uF		50V (436EE/X711)
C801	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C802	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C803	1-163-033-00	CERAMIC CHIP	0.022uF		50V (436EE/X711)
C804	1-163-038-00	CERAMIC CHIP	0.1uF		25V (436EE/X711)
C805	1-163-033-00	CERAMIC CHIP	0.022uF		50V (436EE/X711)
C806	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C807	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C808	1-124-584-00	ELECT	100uF	20%	10V
C809	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C810	1-124-584-00	ELECT	100uF	20%	10V
C811	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C812	1-163-031-11	CERAMIC CHIP	0.01uF		50V (436EE/X711)
C813	1-164-336-11	CERAMIC CHIP	0.33uF		25V
C814	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C815	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C816	1-163-038-00	CERAMIC CHIP	0.1uF		25V (436EE/X711)
C817	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C818	1-163-031-11	CERAMIC CHIP	0.01uF		50V (286EE/X311)
C819	1-163-129-00	CERAMIC CHIP	330PF	5%	50V (436EE/X711)

Ref. No.	Part No.	Description			Remark
C822	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C826	1-124-229-00	ELECT	33uF	20%	10V
C827	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C829	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C830	1-163-095-00	CERAMIC CHIP	12PF	5%	50V (286EE/X311)
C830	1-163-103-00	CERAMIC CHIP	27PF	5%	50V (436EE/X711)
C836	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C838	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C839	1-163-099-00	CERAMIC CHIP	18PF	5%	50V (436EE/X711)
C840	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C841	1-163-093-00	CERAMIC CHIP	10PF	5%	50V (436EE/X711)
C842	1-126-160-11	ELECT	1uF	20%	50V
C843	1-163-038-00	CERAMIC CHIP	0.1uF		25V (436EE/X711)
C845	1-163-031-11	CERAMIC CHIP	0.01uF		50V (436EE/X711)
C846	1-163-031-11	CERAMIC CHIP	0.01uF		50V (436EE/X711)
C883	1-216-025-00	METAL CHIP	100	5%	1/10W (286EE/X311)
C884	1-216-025-00	METAL CHIP	100	5%	1/10W (286EE/X311)
C901	1-163-091-00	CERAMIC CHIP	8PF		50V
C902	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C903	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C904	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C907	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C908	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C909	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C910	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C911	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C912	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C913	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C914	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C916	1-216-295-00	METAL CHIP	0	5%	1/10W
C917	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C920	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C921	1-124-638-11	ELECT	22uF	20%	10V
C938	1-163-131-00	CERAMIC CHIP	390PF	5%	50V

< FILTER >

CF201	1-527-943-00	FILTER, CERAMIC	(436EE/X711:ME, SG, PS)

< CONNECTOR >

CN001	1-573-828-11	CONNECTOR, BOARD TO BOARD 14P

Ref. No.	Part No.	Description	Remark
CN002	1-573-834-11	CONNECTOR, BOARD TO BOARD 20P	
CN801	1-563-585-11	CONNECTOR, FLEXIBLE 8P	
* CN802	1-564-029-00	PIN, CONNECTOR 4P	

< DIODE >

Ref. No.	Part No.	Description	Remark
D001	8-719-801-78	DIODE 1SS184	
D801	8-719-801-78	DIODE 1SS184	(436EE/X711)
D802	8-719-801-78	DIODE 1SS184	
D803	8-719-801-78	DIODE 1SS184	(436EE/X711)
D901	8-719-951-22	IC IMN10	

< DELAY LINE >

Ref. No.	Part No.	Description	Remark
DL001	1-415-668-11	DELAY LINE, ULTRASONIC	(436EE/X711:ME, SG, PS)
DL002	1-415-856-11	DELAY LINE, ULTRASONIC GLASS	
DL003	1-415-728-21	DELAY LINE, 2H (ULTRASONIC)	

< IC >

Ref. No.	Part No.	Description	Remark
IC001	8-759-183-95	IC HA118385FEB	
IC002	8-759-710-07	IC NJM2234M	
IC003	8-759-194-19	IC MSM7450MS-K-TP	
IC004	8-759-035-93	IC SC7S32F	
IC201	8-759-199-28	IC BA7025F-E2	(286EE/436EE/X311/X711:ME, SG, PS)
IC701	8-759-075-70	IC TA75S393F-TE85L	(436EE/X711:ME, SG, PS)
IC801	8-759-267-77	IC HA118291ANT	(286EE/X311)
IC801	8-759-267-78	IC HA118191ANT	(436EE/X711)

< JUMPER RESISTOR >

Ref. No.	Part No.	Description	Remark
JR015	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR022	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR024	1-216-295-00	METAL CHIP 0 5% 1/10W	(436EE/X711)
JR030	1-216-295-00	METAL CHIP 0 5% 1/10W	

< COIL >

Ref. No.	Part No.	Description	Remark
L001	1-408-970-21	INDUCTOR 10uH	
L002	1-408-975-21	INDUCTOR 27uH	
L003	1-408-970-21	INDUCTOR 10uH	
L004	1-408-972-21	INDUCTOR 15uH	
L005	1-408-972-21	INDUCTOR 15uH	
L006	1-408-976-21	INDUCTOR 33uH	
L007	1-408-982-11	INDUCTOR 100uH	
L008	1-408-982-11	INDUCTOR 100uH	
L009	1-408-980-21	INDUCTOR 68uH	
L010	1-408-976-21	INDUCTOR 33uH	
L011	1-408-983-21	INDUCTOR 120uH	
L012	1-408-429-00	INDUCTOR 470uH	
L013	1-408-427-00	INDUCTOR 330uH	
L014	1-408-978-21	INDUCTOR 47uH	
L015	1-408-982-11	INDUCTOR 100uH	
L017	1-408-985-21	INDUCTOR 180uH	
L018	1-408-982-11	INDUCTOR 100uH	
L202	1-408-982-11	INDUCTOR 100uH	(286EE/436EE/X311/X711:ME, SG, PS)
L801	1-408-948-00	INDUCTOR 220uH	
L802	1-408-948-00	INDUCTOR 220uH	(436EE/X711)
L803	1-408-982-11	INDUCTOR 100uH	
L804	1-408-982-11	INDUCTOR 100uH	
L805	1-408-985-21	INDUCTOR 180uH	(436EE/X711)
L810	1-408-985-21	INDUCTOR 180uH	
L812	1-408-982-11	INDUCTOR 100uH	
L813	1-408-970-21	INDUCTOR 10uH	
L814	1-408-970-21	INDUCTOR 10uH	(436EE/X711)
L901	1-408-974-21	INDUCTOR 22uH	
L902	1-408-948-00	INDUCTOR 220uH	
L908	1-408-982-11	INDUCTOR 100uH	

< TRANSISTOR >

Ref. No.	Part No.	Description	Remark
Q001	8-729-010-25	TRANSISTOR MSD601-RT1	
Q002	8-729-010-25	TRANSISTOR MSD601-RT1	
Q003	8-729-010-25	TRANSISTOR MSD601-RT1	
Q004	8-729-010-25	TRANSISTOR MSD601-RT1	
Q005	8-729-421-19	TRANSISTOR UN2213	
Q006	8-729-010-25	TRANSISTOR MSD601-RT1	
Q007	8-729-010-05	TRANSISTOR MSB709-RT1	
Q011	8-729-010-25	TRANSISTOR MSD601-RT1	
Q012	8-729-421-19	TRANSISTOR UN2213	
Q013	8-729-010-25	TRANSISTOR MSD601-RT1	
Q014	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q016	8-729-424-56	TRANSISTOR UN211L	
Q018	8-729-424-18	TRANSISTOR UN2113	
Q021	8-729-421-19	TRANSISTOR UN2213	
Q027	8-729-421-19	TRANSISTOR UN2213	(286EE/436EE/X311/X711:ME, SG, PS)
Q028	8-729-421-19	TRANSISTOR UN2213	
Q029	8-729-421-19	TRANSISTOR UN2213	
Q030	8-729-421-19	TRANSISTOR UN2213	
Q031	8-729-424-08	TRANSISTOR UN2111	(436EE/X711)
Q032	8-729-421-19	TRANSISTOR UN2213	(286EE/436EE/X311/X711:ME, SG, PS)
Q032	8-729-424-90	TRANSISTOR UN221L-TX	(X711:NZ, AS)
Q033	8-729-424-90	TRANSISTOR UN221L-TX	
Q034	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q040	8-729-421-19	TRANSISTOR UN2213	
Q041	8-729-421-19	TRANSISTOR UN2213	
Q046	8-729-421-19	TRANSISTOR UN2213	
Q047	8-729-421-19	TRANSISTOR UN2213	(436EE/X711)

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Ref. No.	Part No.	Description	Remark
Q048	8-729-421-19	TRANSISTOR UN2213	(436EE/X711)
Q049	8-729-421-19	TRANSISTOR UN2213	
Q051	8-729-421-19	TRANSISTOR UN2213	
Q055	8-729-421-19	TRANSISTOR UN2213	
Q201	8-729-010-25	TRANSISTOR MSD601-RT1	(286EE/436EE/X311/X711:ME, SG, PS)
Q810	8-729-421-19	TRANSISTOR UN2213	
⚠Q811	8-729-921-12	TRANSISTOR 2SD1834	
Q815	8-729-421-19	TRANSISTOR UN2213	(436EE/X711)
Q816	8-729-230-49	TRANSISTOR 2SC2712-YG	(436EE/X711)
Q817	8-729-230-49	TRANSISTOR 2SC2712-YG	(436EE/X711)
Q818	8-729-421-19	TRANSISTOR UN2213	
Q819	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q820	8-729-010-25	TRANSISTOR MSD601-RT1	(436EE/X711)
Q821	8-729-010-25	TRANSISTOR MSD601-RT1	(436EE/X711)
Q822	8-729-421-19	TRANSISTOR UN2213	(436EE/X711)
Q839	8-729-421-19	TRANSISTOR UN2213	(436EE/X711)
Q840	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q841	8-729-216-21	TRANSISTOR 2SA1162Y-TE85L	
Q904	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q906	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q907	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q908	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q909	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q931	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q938	8-729-421-19	TRANSISTOR UN2213	
Q939	8-729-424-08	TRANSISTOR UN2111	

< RESISTOR >

Ref. No.	Part No.	Description	Remark
R001	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R002	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R003	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R004	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R005	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R006	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R007	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R008	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R009	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R010	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R012	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R014	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R016	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R017	1-216-083-00	METAL CHIP 27K 5% 1/10W	
R018	1-216-037-00	METAL CHIP 330 5% 1/10W	
R019	1-216-037-00	METAL CHIP 330 5% 1/10W	
R020	1-216-040-00	METAL GLAZE 430 5% 1/10W	(436EE/X711)
R021	1-216-038-00	METAL CHIP 360 5% 1/10W	(436EE/X711)
R022	1-216-041-00	METAL CHIP 470 5% 1/10W	
R023	1-216-041-00	METAL CHIP 470 5% 1/10W	
R024	1-216-035-00	METAL CHIP 270 5% 1/10W	
R025	1-216-056-00	METAL GLAZE 2K 5% 1/10W	
R027	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R029	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R030	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R031	1-216-055-00	METAL CHIP 1.8K 5% 1/10W	
R035	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R040	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R041	1-216-046-00	METAL CHIP 750 5% 1/10W	
R042	1-216-043-00	METAL CHIP 560 5% 1/10W	
R043	1-216-043-00	METAL CHIP 560 5% 1/10W	
R044	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	(286EE/X311)
R044	1-216-075-00	METAL CHIP 12K 5% 1/10W	(436EE/X711)
R045	1-216-058-00	METAL GLAZE 2.4K 5% 1/10W	
R046	1-216-045-00	METAL CHIP 680 5% 1/10W	
R047	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R048	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R049	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R050	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R051	1-216-036-00	METAL CHIP 300 5% 1/10W	
R052	1-216-052-00	METAL CHIP 1.3K 5% 1/10W	
R053	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R055	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R056	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R057	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R058	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R059	1-216-037-00	METAL CHIP 330 5% 1/10W	
R060	1-216-043-00	METAL CHIP 560 5% 1/10W	
R061	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R062	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R065	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R067	1-216-295-00	METAL CHIP 0 5% 1/10W	
R069	1-216-047-00	METAL CHIP 820 5% 1/10W	
R070	1-216-049-00	METAL CHIP 1K 5% 1/10W	(286EE/436EE/X311/X711:ME, SG, PS)
R071	1-216-055-00	METAL CHIP 1.8K 5% 1/10W	(286EE/X311)
R071	1-216-058-00	METAL GLAZE 2.4K 5% 1/10W	(436EE/X711)
R072	1-216-072-00	METAL CHIP 9.1K 5% 1/10W	(436EE/X711)
R074	1-216-073-00	METAL CHIP 10K 5% 1/10W	(286EE/X311)
R075	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R077	1-216-085-00	METAL CHIP 33K 5% 1/10W	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

Ref.No.	Part No.	Description	Remark
R078	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R079	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R080	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R082	1-216-052-00	METAL CHIP 1.3K 5% 1/10W	(286EE/X311)
R082	1-216-055-00	METAL CHIP 1.8K 5% 1/10W	(436EE/X711)
R083	1-216-083-00	METAL CHIP 27K 5% 1/10W	
R084	1-216-089-91	METAL GLAZE 47K 5% 1/10W	
R085	1-216-045-00	METAL CHIP 680 5% 1/10W	
R086	1-216-066-00	METAL CHIP 5.1K 5% 1/10W	
R087	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	(436EE/X711)
R088	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	(286EE/X311)
R088	1-216-066-00	METAL CHIP 5.1K 5% 1/10W	(436EE/X711)
R089	1-216-117-00	METAL CHIP 680K 5% 1/10W	
R091	1-216-295-00	METAL CHIP 0 5% 1/10W	
R092	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	(436EE/X711)
R093	1-216-047-00	METAL CHIP 820 5% 1/10W	
R094	1-216-073-00	METAL CHIP 10K 5% 1/10W	(436EE/X711)
R099	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R102	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R111	1-216-109-00	METAL CHIP 330K 5% 1/10W	
R113	1-216-295-00	METAL CHIP 0 5% 1/10W	
R115	1-216-129-00	METAL CHIP 2.2M 5% 1/10W	
R119	1-216-066-00	METAL CHIP 5.1K 5% 1/10W	(436EE/X711)
R204	1-216-049-00	METAL CHIP 1K 5% 1/10W	(286EE/436EE/X311/X711:ME, SG, PS)
R205	1-216-073-00	METAL CHIP 10K 5% 1/10W	(286EE/436EE/X311/X711:ME, SG, PS)
R206	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	(286EE/436EE/X311/X711:ME, SG, PS)
R207	1-216-109-00	METAL CHIP 330K 5% 1/10W	(286EE/436EE/X311/X711:ME, SG, PS)
R208	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	(286EE/436EE/X311/X711:ME, SG, PS)
R269	1-216-081-00	METAL CHIP 22K 5% 1/10W	(286EE/436EE/X311/X711:ME, SG, PS)
R270	1-216-081-00	METAL CHIP 22K 5% 1/10W	(286EE/436EE/X311/X711:ME, SG, PS)
R701	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	(436EE/X711:ME, SG, PS)
R702	1-216-079-00	METAL CHIP 18K 5% 1/10W	(436EE/X711)
R703	1-216-073-00	METAL CHIP 10K 5% 1/10W	(436EE/X711)
R801	1-216-019-00	METAL CHIP 56 5% 1/10W	(286EE/X311)
R801	1-216-023-00	METAL CHIP 82 5% 1/10W	(436EE/X711)
R802	1-216-037-00	METAL CHIP 330 5% 1/10W	
R805	1-216-604-11	METAL CHIP 11 0.50% 1/10W	(286EE/X311)
R805	1-216-605-11	METAL CHIP 12 1% 1/10W	(436EE/X711)
R806	1-216-019-00	METAL CHIP 56 5% 1/10W	(286EE/X311)
R806	1-216-023-00	METAL CHIP 82 5% 1/10W	(436EE/X711)
R807	1-216-023-00	METAL CHIP 82 5% 1/10W	(436EE/X711)
R811	1-216-037-00	METAL CHIP 330 5% 1/10W	
R812	1-216-023-00	METAL CHIP 82 5% 1/10W	(436EE/X711)
R815	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R816	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R817	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R835	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R836	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R838	1-216-075-00	METAL CHIP 12K 5% 1/10W	
R840	1-216-627-11	METAL CHIP 100 0.5% 1/10W	(436EE/X711)
R841	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	(436EE/X711)
R842	1-216-619-11	METAL CHIP 47 0.5% 1/10W	(436EE/X711)
R843	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	(436EE/X711)
R844	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R846	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R847	1-216-078-00	METAL GLAZE 16K 5% 1/10W	
R848	1-216-077-00	METAL CHIP 15K 5% 1/10W	(436EE/X711)
R849	1-216-073-00	METAL CHIP 10K 5% 1/10W	(436EE/X711)
R850	1-216-049-00	METAL CHIP 1K 5% 1/10W	(436EE/X711)
R851	1-216-051-00	METAL CHIP 1.2K 5% 1/10W	(436EE/X711)
R852	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	(436EE/X711)
R853	1-216-049-00	METAL CHIP 1K 5% 1/10W	(436EE/X711)

Ref. No.	Part No.	Description			Remark
R856	1-216-033-00	METAL CHIP	220	5%	1/10W
R857	1-216-033-00	METAL CHIP	220	5%	1/10W
R858	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R859	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R860	1-216-057-00	METAL CHIP	2.2K	5%	1/10W (436EE/X711)
R861	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R862	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R863	1-216-047-00	METAL CHIP	820	5%	1/10W
R901	1-216-039-00	METAL CHIP	390	5%	1/10W
R902	1-216-033-00	METAL CHIP	220	5%	1/10W
R903	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R904	1-216-295-00	METAL CHIP	0	5%	1/10W
R906	1-216-077-00	METAL CHIP	15K	5%	1/10W
R907	1-216-075-00	METAL CHIP	12K	5%	1/10W
R908	1-216-033-00	METAL CHIP	220	5%	1/10W
R910	1-216-025-00	METAL CHIP	100	5%	1/10W
R913	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R914	1-216-077-00	METAL CHIP	15K	5%	1/10W
R915	1-216-075-00	METAL CHIP	12K	5%	1/10W
R916	1-216-039-00	METAL CHIP	390	5%	1/10W
R917	1-216-045-00	METAL CHIP	680	5%	1/10W
R918	1-216-043-00	METAL CHIP	560	5%	1/10W
R919	1-216-039-00	METAL CHIP	390	5%	1/10W
R920	1-216-043-00	METAL CHIP	560	5%	1/10W
R921	1-216-049-00	METAL CHIP	1K	5%	1/10W
R922	1-216-047-00	METAL CHIP	820	5%	1/10W
R924	1-216-035-00	METAL CHIP	270	5%	1/10W
R925	1-216-045-00	METAL CHIP	680	5%	1/10W
R926	1-216-025-00	METAL CHIP	100	5%	1/10W
R927	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R928	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R929	1-216-043-00	METAL CHIP	560	5%	1/10W
R931	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R933	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R947	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R966	1-216-295-00	METAL CHIP	0	5%	1/10W

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description	Remark
RV001	1-238-856-11	RES, ADJ, CERMET 10K	
RV003	1-238-856-11	RES, ADJ, CERMET 10K	
RV004	1-238-856-11	RES, ADJ, CERMET 10K	
RV005	1-238-856-11	RES, ADJ, CERMET 10K	
RV006	1-238-857-11	RES, ADJ, CERMET 22K	
RV009	1-238-854-11	RES, ADJ, CERMET 2.2K	
RV201	1-238-852-11	RES, ADJ, CERMET 470	(286EE/436EE/X311/X711:ME, SG, PS)

< TRANSFORMER >

Ref. No.	Part No.	Description	Remark
T001	1-403-617-11	COIL, TANK	
T201	1-409-467-11	COIL (TRAP 7.8K)	(286EE/436EE/X311/X711:ME, SG, PS)

< VIBRATOR >

Ref. No.	Part No.	Description	Remark
X001	1-760-118-21	VIBRATOR, CRYSTAL (4.43MHz)	
X002	1-760-119-11	VIBRATOR, CRYSTAL (436EE/X711:ME, SG, PS) (3.58MHz)	

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MISCELLANEOUS

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Ref. No.	Part No.	Description	Remark
3	1-467-489-11	SWITCH BLOCK, CONTROL (X711:ME, SG, PS)	
3	1-467-489-21	SWITCH BLOCK, CONTROL (436EE)	
3	1-467-489-31	SWITCH BLOCK, CONTROL (X711:NZ, AS)	
58	1-751-794-21	CABLE, FFC (FMD-5)	
126	1-467-488-21	SWITCH BLOCK, CONTROL (X311)	
126	1-467-488-61	SWITCH BLOCK, CONTROL (286EE)	
128	1-751-794-21	CABLE, FFC (FMD-5)	
818	8-848-540-01	UPPER DRUM ASSY (DZR-21-R) (436EE/X711)	
842	3-949-187-01	DRUM (TPB3-011), UPPER (286EE/X311)	
847	3-947-043-01	MOTOR (E20EL), DRUM (286EE/X311)	
⚠M901	8-848-597-11	DRUM ASSY (DZH-48A-R) (436EE/X711)	
⚠M901	3-949-186-01	CYLINDER ASSY (DRUM) (286EE/X311)	
M902	3-947-028-01	MOTOR (F2QKB38) (CAPSTAN)	
M903	3-946-917-01	MOTOR ASSY, L (LOADING)	

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ACCESSORIES & PACKING MATERIALS

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Ref. No.	Part No.	Description	Remark
⚠	1-569-008-11	ADAPTER, CONVERSION 2P (X711:ME, PS, SG)	
⚠	1-575-131-11	CORD, POWER SUPPLY	
	1-696-593-11	CORD, CONNECTION (PAL)	
	3-758-028-11	MANUAL, INSTRUCTION (ENGLISH) (436EE/X711:PS)	
	3-758-028-21	MANUAL, INSTRUCTION (ENGLISH) (X711:NZ, AS)	
	3-758-028-51	MANUAL, INSTRUCTION (CHINESE) (X711:PS)	
	3-758-028-61	MANUAL, INSTRUCTION (ENGLISH, SPANISH, ARABIC, RUSSIAN) (X711:ME, SG)	
	3-758-028-71	MANUAL, INSTRUCTION (POLISH, CZECK) (436EE)	
	3-758-028-91	MANUAL, INSTRUCTION (RUSSIAN) (436EE/X711:PS)	
	3-758-033-11	MANUAL, INSTRUCTION (ENGLISH) (286EE, X311:PS)	
	3-758-033-51	MANUAL, INSTRUCTION (CHINESE) (X311:PS)	
	3-758-033-61	MANUAL, INSTRUCTION (ENGLISH, SPANISH, ARABIC) (X311:SG)	

The components identified by
mark ⚠ or dotted line with mark
⚠ are critical for safety.
Replace only with part number
specified.

Ref.No.	Part No.	Description	Remark
	3-758-033-71	MANUAL, INSTRUCTION (POLISH, CZECK) (286EE)	
	3-758-033-91	MANUAL, INSTRUCTION (RUSSIAN)	(286EE, X311:PS)
*	3-957-231-01	CUSHION (UPPER) (286EE/X311)	
*	3-957-232-01	CUSHION (LOWER) (286EE/X311)	
*	3-957-412-01	CUSHION (UPPER) (436EE/X711)	
*	3-957-413-01	CUSHION (LOWER) (436EE/X711)	
*	3-957-657-01	INDIVIDUAL CARTON (436EE)	
*	3-957-657-11	INDIVIDUAL CARTON (X711:AS)	
*	3-957-657-21	INDIVIDUAL CARTON (X711:NZ)	
*	3-957-668-01	INDIVIDUAL CARTON (286EE)	
*	3-957-671-01	INDIVIDUAL CARTON (X311:PS)	
*	3-957-671-11	INDIVIDUAL CARTON (X311:SG)	
*	3-958-760-01	INDIVIDUAL CARTON (X711:PS)	
*	3-958-760-11	INDIVIDUAL CARTON (X711:SG)	

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HARDWARE LIST

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#1	7-624-106-04	STOP RING 3.0, TYPE -E
#2	7-685-782-01	SCREW +PTT 2X5 (S)
#3	7-685-648-79	SCREW +BVTP 3X12 TYPE2 IT-3
#21	7-621-773-86	SCREW +PTT 2.6X4 (S)
#22	7-621-770-87	SCREW +PTT 2.6X5 (S)
#23	7-682-547-04	SCREW +PTT 3X6 (S)
#24	7-628-254-00	SCREW +PS 2.6X5

SECTION 6
INTERFACE, IC PIN FUNCTION DESCRIPTION

6-1. SYSTEM CONTROL – MECHANISM BLOCK INTERFACE (MA-203 BOARD IC501)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOAD-ING	TAPE THREAD-ING	TAPE UNTHREAD-ING	STOP	FF	REW	PB	PB-PAUSE	SLOW	× 2	CUE	REVIEW	REC	REC-PAUSE
CAM M	MA-203 Board IC501 (91)	O	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L
CAMP	MA-203 Board IC501 (92)	O	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L
MODE 1	MA-203 Board IC501 (58)	I	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H
MODE 2	MA-203 Board IC501 (57)	I	L	H	L	L	H	L	L	L	L	H	H	L	L	L	L	H
MODE 3	MA-203 Board IC501 (56)	I	H	H	H	L	H	H	H	H	L	L	L	L	L	L	L	L
MODE 4	MA-203 Board IC501 (55)	I	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
C-OUT	MA-203 Board IC501 ㉚	I	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
C-START	MA-203 Board IC501 ㉙	I	H	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H
C-IN	MA-203 Board IC501 ㉘	I	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L
REC SAF	MA-203 Board IC501 (78)	I	L	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
T REEL FG	MA-203 Board IC501 ⑯	I	H/L	H/L	H/L	H/L	H/L	H/L	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
S REEL FG	MA-203 Board IC501 ⑮	I	H/L	H/L	H/L	*2	*2	H/L	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
END LED	MA-203 Board IC501 ㉛	O	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3
CAP TRQ1	MA-203 Board IC501 ㉟	O	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
CAP TRQ2	MA-203 Board IC501 ㊱	O	H	H	H	H	H	H	H	H	H	H	*4	H	H	H	H	H
CAP STOP	MA-203 Board IC501 ㉞	O	L	*5	*5	*5	*5	L	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5
T SENS	MA-203 Board IC501 (63)	I	*3	*3	*3	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
S SENS	MA-203 Board IC501 (64)	I	*3	*3	*3	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6

*1. "L" when erasing protection tab is bent. "H" when not bent.
*2. Pulse of period in proportion to reel rotating speed.
*3. Approx. 2 msec period "H" pulse.
*4. pulse.
*5. 3 value output of "H", "L" and "Hi-Z (2.5 V)".
*6. Nomally "L". 2 msec period "H" pulse when tape top or tape end is detected.

6-2. SYSTEM CONTROL – SERVO PERIPHERAL CIRCUIT INTERFACE (MA-203 BOARD IC501)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB·PAUSE	SLOW	×2	CUE	REVIEW	REC	REC·PAUSE
REC CTL	MA-203 IC501 ⑦	O	*14	*14	*14	*14	*14	*14	*14	*14	*14	*14	*14	*1	*14
STEP PLS	MA-203 IC501 ⑭	O	L	*2	*2	*2	*2	*2	L	*3	*2	*2	*2	*2	L
SW POSITION *4	MA-203 IC501 (62)	I													
$\overline{\text{PB CTL}}$	MA-203 IC501 (61)	I	H	*5	*5			*1	H/L	*3	*5	*5	*5	*1	H
DRUM PG	MA-203 IC501 (68)	I	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
DRUM FG	MA-203 IC501 (69)	I	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
CAP FG	MA-203 IC501 (70)	I	H/L	*8	*8	*9	*9	*8	H/L	*10	*8	*8	*8	*8	H/L
CAP RVS	MA-203 IC501 (72)	O	H/L	L	H	L	H	L	L	*3	L	L	H	L	*L
CAP DA *14	MA-203 IC501 (73)	O	*11	*11	*11	*11	*11	*12	*11	*11	*12	*12	*12	*12	*11
DRUM DA *4	MA-203 IC501 (74)	O	*13	*13	*13	*13	*13	*13	*13	*13	*13	*13	*13	*13	*13
CTL STEP	MA-203 IC501 (76)	O	L	L	L	L	L	L	L	*15	L	L	L	L	L

*1. 25 Hz or 30 Hz pulse.
*2. 25 Hz or 30 Hz value output of "H", "L" and Hi-Z (2.5 V).
*3. 25 Hz or 30 Hz Unstable period Pulse.
*4. 25 Hz or 30 Hz Input terminal for video switching position adjustment.
*5. 25 Hz or 30 Hz Pulse of period in propotion to tape speed.
*6. 25 Hz or 30 Hz 30 Hz "H" pulse.
*7. 600 Hz or 720 Hz pulse.
*8. Pulse of period in proportion to tape speed.
*9. Unstable period pulse
*10. Pulse at tape running.
*11. Approx. 2 msec period "H" or "L" pulse.
*12. Approx. 1.5 msec period "H" or "L" pulse.
*13. Approx. 3 msec period "H" or "L" pulse.
*14. Hi-Z (2.5 V).
*15. "H" when FWD diedirection STEP drive.

6-3. SYSTEM CONTROL – SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-203 BOARD IC501)

Signal	Pin No.	I/O	I/O level
$\overline{\text{COSMO·RESET}}$	MA-203 Board IC501 ㊵	I	Normally "H". "L" when service interruption is detected or restored.
$\overline{\text{COSMO·CS}}$	MA-203 Board IC501 ㊹	I	Always "H".
SI·BUS	MA-203 Board IC501 ㊺	I	Serial communication data from timer microprocessor. V period "L" pulse.
SO·BUS	MA-203 Board IC501 ㊻	O	Serial communication data to timer microprocessor. V period "L" pulse.
$\overline{\text{S CLK}}$	MA-203 Board IC501 ㊼	I	Serial communication clock with timer microprocessor. V period "L" pulse.

6-4. SYSTEM CONTROL AND RF MODULATOR – INPUT SELECTION BLOCK INTERFACE (MA-203 BOARD IC501)

Signal	Pin No.	I/O	I/O level
LINE 1	MA-203 Board IC501 ⑱	O	Input select control signal.

6-5. SYSTEM CONTROL – VIDEO BLOCK INTERFACE (MA-203 BOARD IC501)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOAD-ING	PB	PB·PAUSE	SLOW	×2	CUE	REVIEW	REC	REC·PAUSE
$\overline{\text{V-PB}}$	MA-203 Board IC501 (91)	O	H	H	H	L	L	L	L	L	L	H	H
HEAD CONT	MA-203 Board IC501 ⑰	O	L	L	L	L	H	*1	H	L	L	H	L
RF SWP.	MA-203 Board IC501 ①	O	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
Q VD	MA-203 Board IC501 ②	O	L	L	L	*3	*4	*4	*4	*4	*4	L	L
$\overline{\text{SP}}$	MA-203 Board IC501 ⑩	O	*5	*5	*5	*6	*6	*6	*6	*6	*6	*5	*5
REC. P	MA-203 Board IC501 ⑤	O	L	L	L	L	L	L	L	L	L	L	H
REC	MA-203 Board IC501 ⑥	O	L	L	L	L	L	L	L	L	L	H	H
V SYNC	MA-203 Board IC501 (66)	I	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7

*1. "H" when tape stops. "L" when tape runs (approx. for 33 msec).
*2. Syncronized with drum rotation. 25 Hz or 30 Hz 50% duty pulse.
*3. Normally "L". "H" when video signal is not generated.
*4. V period "H" pulse.
*5. Selected by SP/EP. SP mode: "L", EP mode: "H".
*6. Selected by tape recording mode.

sig/mod	SP	LP	EP
SP (10)	L	H	H
LP (11)	L	H	L
EP (12)	L	L	H

*7. Composite sync signal (positive).
*8. "H" when menu screen or blue back screen.

6-6. SYSTEM CONTROL – AUDIO BLOCK INTERFACE (MA-203 BOARD IC501)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOAD-ING	PB	PB·PAUSE	SLOW	×2	CUE	REVIEW	REC	REC·PAUSE
NA PB	MA-203 Board IC501 (94)	O	L	L	L	H	H	H	H	H	H	L	L
A MUTE	MA-203 Board IC501 (95)	O	L	L	L	L	H	H	H	H	H	L	L
NA REC P	MA-203 Board IC501 ⑬	O	L	L	L	L	L	L	L	L	L	H	L
$\overline{\text{SP}}$	MA-203 Board IC501 ⑩	O	*1	*1	*1	*2	*2	*2	*2	*2	*2	*1	*1

*1. Selected by SP/EP selector. SP mode: "L", EP mode: "H".
*2. Selected by tape recording mode. SP mode: "L", EP mode: "H".

6-7. SERVO/SYSTEM CONTROL MICROPROCESSOR PIN FUNCTION (MA-203 BOARD IC501)

Pin. No.	Port	I/O	Name	Function
1	PB5/PPO13	O	RF SWP	Video switching pulse output
2	PB4/PPO12	O	Q VD	Quasi VD pulse output
3	PB3/PPO11	O	Q HD ENABLE	Quasi HD control
4	PB2	O	AF REC $\overline{\text{P}}$	Not used
5	PB1	O	REC • $\overline{\text{P}}$	"H" output when video REC (REC control)
6	PB0	O	REC	"H" output when REC
7	PC7	O	REC CTL	REC CTL output
8	PC6	I	$\overline{\text{STEREO}}$	Not used
9	PC5	O	NC	Not used
10	PC4	O	$\overline{\text{SP}}$	"L" when SP mode
11	PC3	I	$\overline{\text{POWER FAIL}}$	"L" when AC OFF
12	PC2	O	EP/LP/$\overline{\text{SP}}$	Not used
13	PC1	O	NA REC $\overline{\text{P}}$	"H" output when Audio REC
14	PC0	O	STEP PLS	"H" when capstan STEP is driven
15	PJ7	I	S REEL FG	S reel sensor input
16	PJ6	I	T REEL FG	T reel sensor input
17	PJ5	O	HEAD CONT	Head amp IC control
18	PJ4	O	LINE 1	"H" when LINE output
19	PJ3	I	3.58 MHz	"H" when 3.58 mode
20	PJ2	I	RENTAL	"H" when NOISE REDUCTION Not used
21	PJ1	O	SECAM	"H" when SECAM mode Not used
22	PJ0	I	ME SECAM	"H" when ME SECAN mode
23	PD7	I	MAIN/$\overline{\text{SAP}}$	Not used
24	PD6	I	TU CLOCK	Tuner control signal
25	PD5	I	TU PATA	
26	PD4	I	TU ENABLE	
27	PD3	O	NT JUDGE	Not used
28	PD2	I	C-IN	Cassette switch input
29	PD1	I	C-START	
30	PD0	I	C-OUT	
31	PH7	O	SYS CHECK	SYSTEM CHECK signal output Not used
32	PH6	O	SYS RESET	SYSTEM RESET signal
33	PH5	O	$\overline{\text{EEPR CS}}$	EEPROM control signal
34	PH4	O	CAP STOP	"L" when capstan stopped
35	PH3	O	CAP TRQ 1	Current drive capstan motor control
36	PH2	O	CAP TRQ 2	
37	PH1	O	END LED	End sensor lamp drive output
38	PH0	O	OSD ENABLE	OSD control signal output
39	MP	I	MP	Fixed "L" level
40	$\overline{\text{RST}}$	I	$\overline{\text{COSMO RESET}}$	System reset input

Pin. No.	Port	I/O	Name	Function
41	Vss		Vss	GND
42	XTAL	O	XTAL	System clock 12 MHz
43	EXTAL	I	EXTAL	
44	$\overline{\text{CS0}}$	O	$\overline{\text{COSMO CS}}$	Fixed "L" level
45	SI0	I	SI BUS	Signal for serial communication
46	SO0	O	SO BUS	Signal for serial communication
47	$\overline{\text{SCK0}}$	O	$\overline{\text{S CLK}}$	Clock for serial communication
48	PE7/AN11	I	$\overline{\text{NTSC}}$	"L" when video system NTSC mode
49	PF6/AN10	I	AFT	AFT signal input
50	PF5/AN9	I	LP JOG	"H" when LP JOG mode
51	PF4/AN8	O	AF SW POSI	VR input for AF SWP adjustment Not used
52	AVss		AVss	UNSW GND
53	AVREF		AFREF	AD port reference input UNSW 5V
54	AVDD		AVDD	UNSW 5V
55	PF3/AN7	I	MODE 4	Mechanism section CAM encoder input
56	PF2/AN6	I	MODE 3	
57	PF1/AN5	I	MODE 2	
58	PF0/AN4	I	MODE 1	
59	AN3	I	DEST/DEW	Descrimination DC input
60	AN2	I	RF ENV	Video RF envelope input
61	AN1	I	AF ENV	HiFi audio RF envelope Not used
62	AN0	I	RF SW POSI	VR input for RF SWP adjustment
63	PG7	I	T SENS	Take-up side end sensor input
64	PG6	I	S SENS	Supply side end sensor input
65	PG5	I	$\overline{\text{H DET}}$	H sync-descrimination input
66	PG4/SYNC	I	V SYNC	Composite sync input
67	PG3/$\overline{\text{PBCTL}}$	I	$\overline{\text{PB CTL}}$	Playback CTL input
68	PG2/DPG	I	DRM PG	Drum PG input
69	PG1/DFG	I	DRM FG	Drum FG input
70	PG0/CFG	I	CAP FG	Capstan FG input
71	PE7	O	$\overline{\text{JOG}}$	"L" when JOG mode
72	PE6	O	CAP RVS	Capstan reverse signal output
73	PE5	O	CAP DA	Capstan error D/A output
74	PE4	O	DRUM DA	Drum error D/A output
75	PE3	O	CTL REC	"H" when CTL writing
76	PE2	O	CTL STEP	CTL amp step action control
77	PE1	O	R/B	EEPROM control output
78	PE0		REC SAF	Erasing protection tab detection
79	SI1	O	AUTO PRESET	"H" during auto preset Not used
80	SO1	O	EXP SO	Not used

Pin. No.	Port	I/O	Name	Function
81	$\overline{\text{SCKI}}$		EXP CLK	Not used
82	PI4	O	$\overline{\text{E TAPE}}$	"L" when high RF level tape PB
83	PI3	O	$\overline{\text{F MONO}}$	"L" when monoral mode. Not used
84	PI2/$\overline{\text{PWM}}$	O	ANT TV	Not used
85	PI1/RMC	I	RMC	SIRCS signal output
86	TEX	I	TEX	
87	TX		TX	
88	V_{SS}		V_{SS}	GND
89	V_{DD}		V_{DD}	UNSW 5V
90	N.C.			UNSW 5V
91	PA7	O	CAM M	Loading motor control
92	PA6	O	CAM P	
93	PA5	O	POWER ON	"H" when during power on
94	PA4	O	NA PB	"H" when audio playback
95	PA3	O	A MUTE	Audio muting output "H" : muting
96	PA2	O	$\overline{\text{V-PB}}$	"L" when video playback
97	PA1	O	$\overline{\text{SYS RESET}}$	System reset signal
98	PA0	O	$\overline{\text{LCD CS}}$	LCD drive micon control signal
99	PB7	O	TV/VTR	Not used
100	PB6/PPO14	O	AF SWP	Not used

6-8. LCD DRIVER PIN FUNCTION (HI-2/3 BOARD IC001)

Pin No.	Pin Name	I/O	Function
1 – 20	SEG 12 – 31	O	LCD segment output
21 – 23	COM 0 – 2	O	LCD common output
24	N. C.	O	Not used
25	BIAS	O	Open. Not used
26 – 28	VLC 0 – 2	O	Open. Not used
29	REC	O	REC LED output
30	TIM REC	O	TIMER REC LED output
31, 32	N. C.	O	Not used
33	GND		Ground
34 – 37	KEYOUT 0 – 3	O	Key output
38	N. C.	I	Not used
39	$\overline{\text{S CLK}}$	I	Serial clock input
40	SI	O	Serial communication output to system controller
41	$\overline{\text{SO}}$	I	Serial communication input from system controller
42	N. C.	I	Not used
43	LCD CS	I	Chip select signal for LCD input
44, 45	N. C.	I	Not used
46	POWER LED	O	Power LED output
47	N. C.	O	Not used
48	N. C.	O	Not used
49	N. C.	O	Open. Not used
50	N. C.	O	Not used
51	$\overline{\text{B. LIGHT LED}}$	O	Back light LED on/off output H: ON
52	N. C.	O	Not used
53	$\overline{\text{BACK LIGHT}}$	O	Back light on/off output L: ON
54, 57	V_{DD}		Power supply +5 V
55, 56	N. C.	I	Not used
58, 59	X1, 2	I	Main system clock input
60 – 67	KEYIN 0 – 7	I	Key input
68	$\overline{\text{RST}}$	I	Reset input
69 – 80	SEG 0 – 11	O	LCD segment output

SECTION 7
ADJUSTMENTS

During the adjustment, see the Parts Arrangement Diagram for adjustments on Page 7-6.

7-1. MECHANICAL ADJUSTMENTS

Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT Ⅲ.

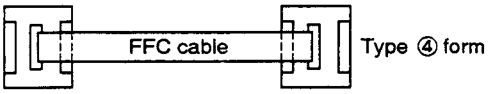
7-2. ELECTRICAL ADJUSTMENTS

2-1. PRE-ADJUSTMENT PREPARATIONS

Necessary items and indications for total adjustment of electric circuit of this machine will be described in this chapter.

2-1-1. Instruments to be Used

1) Color TV
2) Oscilloscope 1 or 2 phenomena, band more than 30 MHz, delay mode, as provided.
3) Frequency counter (min. 8 digits)
4) PAL, SECAM pattern generator
5) Digital voltmeter
6) Audio level meter
7) Audio generator
8) Attenuator
9) Alignment tape
   Part Code: H7099052H (MH-2)
10) Extension cables (See page 7-2 for using location)


FFC cable
Type ④ form

① RV-33 (CN001) ↔ MA-203 (CN801)
(14 pins J-6090-044-A)
② RV-33 (CN002) ↔ MA-203 (CN802)
(20 pins J-6090-043-A)

2-1-2. Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

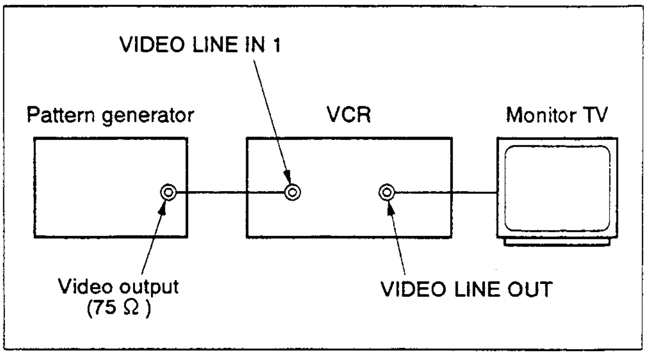

VIDEO LINE IN 1
Pattern generator
VCR
Monitor TV
Video output
(75 Ω)
VIDEO LINE OUT

Fig. 7-2-1.

2-1-3. Set-up Adjustment

In this adjustment, PAL pattern generator is connected with LINE 1 input signal terminal. When check to tuner, connected AERIAL terminal. Check that the amplitudes of video signal SYNC signal, of picture portions, and of burst signals are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst sigal and "red" signal are 0.30 : 0.66. Fig. 7-2-2. shows video signals (color bars) used in adjusting the video section.

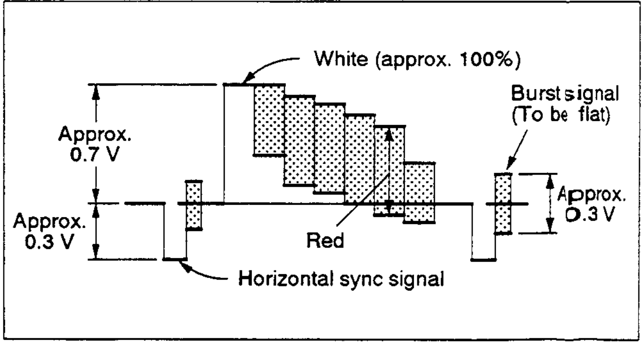

White (approx. 100%)
Burst signal
(To be flat)
Approx.
0.7 V
Approx.
0.3 V
Red
Approx.
0.3 V
Horizontal sync signal

Fig. 7-2-2.

2-1-4. Alignment Tape (MH-2)

	Time	Video signal	Audio signal
1	10 minutes	Stair-step	6 kHz
2	5 minutes	—	3 kHz
3	10 minutes	Color bar	1 kHz
4	3 minutes	RF sweep	—

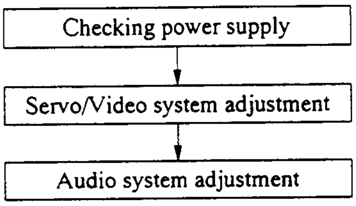
2-1-5. Specified I/O Level and Impedance

Input/output terminal

Video input	LINE IN	: phono jack 1 Vp-p, 75 Ω , unbalanced, sync negative
Audio input	LINE IN	: phono jack 47 kΩ , − 7.5 dBs (0 dBs = 0.775 Vrms) More than 10 kΩ , − 4 dBs
Video output	LINE OUT	: phono jack 1 Vp-p, 75 Ω , unbalanced, sync negative
Audio output	LINE OUT	: phono jack − 7.5 dBs at load impedance 47 kΩ Output impedance : less than 10 kΩ

2-1-6. Adjusting Sequence

Make the electrical adjustment in the following sequence.


Checking power supply
Servo/Video system adjustment
Audio system adjustment

2-2. POWER SUPPLY CHECK (MA-203 BOARD)

Mode	E-E
Measuring Instrument	Digital voltmater
SW 12 V check	
Measurement Point	Pin ③ of IC121
Specified Value	12.0 ± 0.3 Vdc
MTR 12 V check	
Measurement Point	Cathode of D121
Specified Value	12.4 ± 0.5 Vdc
SW 5 V check	
Measurement Point	Enter of Q123
Specified Value	5.0 ± 0.2 Vdc
D5 V check	
Measurement Point	Cathode of D502
Specified Value	5.1 ± 0.2 V
DC 40 V check	
Measurement Point	C187 ⊕ side
Specified Value	44.0 ± 1.5 V Vdc

Checking Method:

1) Confirm that each voltage meets its specified value.

2-3. SERVO/VIDEO SYSTEM ADJUSTMENTS

- **NOTE ON REPAIRING RV-33 BOARD**

  [Servicing Jig]
  MA-203 ↔ RV-33 Extension cable.
  ⓐ 14 pins (J-6090-046-A) CN801 ↔ CN001
  ⓑ 20 pins (J-6090-045-A) CN802 ↔ CN002

① There are two types of the connectors between MA-203 and RV-33 boards according to the manufacturing companies (TAIKO or MOLEX). They are not interchangeable.

② Servicing jigs are for common use.
When using it, please be sure to confirm the form of connectors.

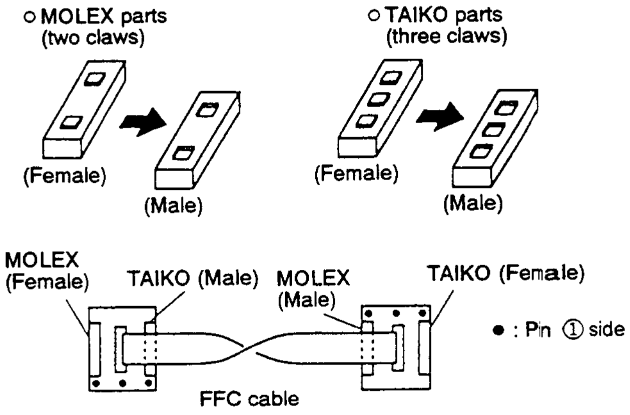

o MOLEX parts
(two claws)
o TAIKO parts
(three claws)
(Female)
(Male)
(Female)
(Male)
MOLEX
(Female)
TAIKO (Male)
MOLEX
(Male)
TAIKO (Female)
● : Pin ① side
FFC cable

Fig. 7-2-3

- EXTENSION CABLE USING LOCATION
  (See page 7-1 for details of extension cables.)

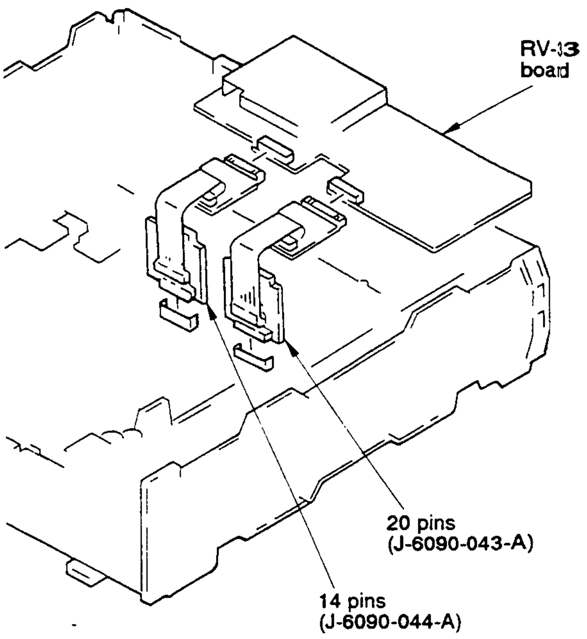

RV-33
board
20 pins
(J-6090-043-A)
14 pins
(J-6090-044-A)

Fig. 7-2-4.

2-3-1. Switching Position Adjustment (MA-203 Board)

Purpose:

Adjust the interval between A ch and B ch of tape playback output.

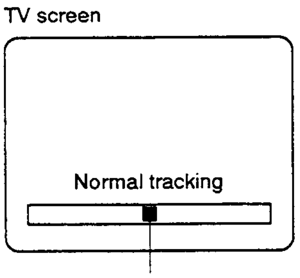
Improve the interchangeability with other tapes and sets.

When it is out of order, the interval appears on the screen, the screen is disturbed.

Mode	PB
Signal	Alignment tape
Measurement Point	CH1: CNJ001 VIDEO LINE OUT CH2: Pin ③ of CN802 (RV-33 board) (RF SWP)
Measuring Instrument	Oscilloscope
Adjusting Element	RV502
Specified Value	6.5 ± 0.5 H (416 ± 32 μsec)

Adjusting Method:

1) Adjust the tracking position to the center by pushing tracking buttons ▲, ▼ (on remote commander).
2) Check that switching position is 6.5 ± 0.5 H. (416 ± 32 μsec)
   If not meet the specified value, turn RV502 and repeat steps 1) to 2).


TV screen
Normal tracking

Pushing ▲ button makes right moving,
▼ button makes left moving.

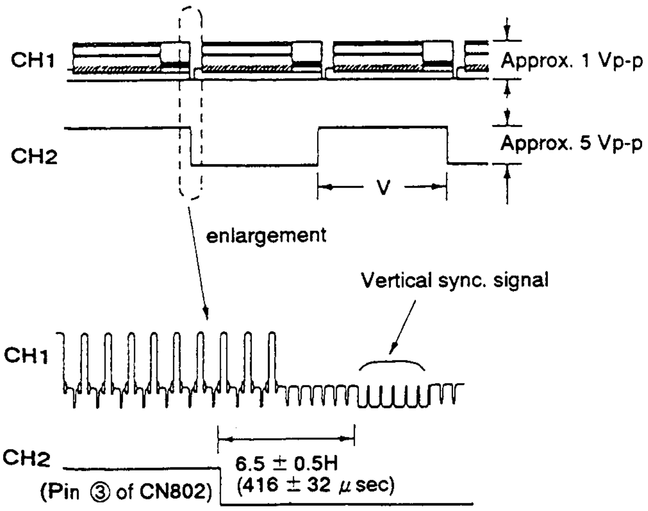

CH1
Approx. 1 Vp-p
CH2
Approx. 5 Vp-p
V
enlargement
Vertical sync. signal
CH1
CH2
(Pin ③ of CN802)
6.5 ± 0.5H
(416 ± 32 μsec)

Fig. 7-2-5.

2-3-2. Sync AGC Adjustment (RV-33 Board)

Mode	E-E
Signal	Color bar
Measurement Point	CNJ001 VIDEO LINE OUT (MA-203 board)
Measuring Instrument	Oscilloscope
Adjusting Element	RV001
Specified Value	1.00 ± 0.05 Vp-p

Note : VIDEO LINE OUT terminal must be terminates at 75Ω.

Adjusting Method:

1) With RV001, adjust the VIDEO signal level to 1.00 ± 0.05 Vp-p

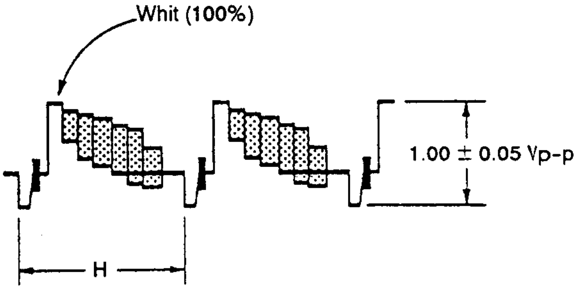

Whit (100%)
1.00 ± 0.05 Vp-p
H

Fig. 7-2-6

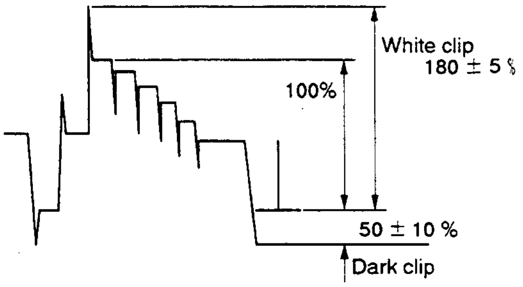
2-3-3. White Clip Adjustment (RV-33 Board)

Purpose:

Adjust the frequency of FM modulated YFM signal doesn't go too high.

When it is out of order, white goes flat and black is over-modulated.

Signal	Color bar
Measurement Point	Pin ㊺ of IC001
Measuring Instrument	Oscilloscope
Adjusting Element	RV004
Specified Value	White clip : 180 ± 5% Dark clip : 50 ± 10%


White clip
180 ± 5 %
100%
50 ± 10 %
Dark clip

Fig, 7-2-7

2-3-4. Recording Chroma Adjustment (RV-33 Board)

Purpose:

Adjust recording chroma level.
When it is out of order, S/N ratio of color goes bad, the picture is not colored and second sequence beat appears.
( ) : SLV-282EE/X311PS/SG

Mode	E-E
Signal	Color bar
Measurement Point	Q013 Emitter
Measuring Instrument	Oscilloscope
Adjusting Element	RV009
Specified Value	120 ± 10 mVp-p (180 ± 10 mVp-p)

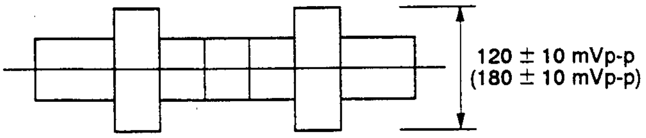


Fig. 7-2-8

Reference:

Adjusting level is low; Bad color S/N ratio, not colored.
Adjusting level is high; Second sequence beat (squared noise) appears.

2-3-5. Playback Level Adjustment (RV-33 Board)

Purpose:

Adjust playback video signal level to the specification.
When it is out of order, the picture is darkened or brightened on TV screen. White goes flat.

Mode	Playback
Signal	Color bar or alignment tape
Measurement Point	VIDEO LINE OUT
Measuring Instrument	Oscilloscope
Adjusting Element	RV003
Specified Value	1.0 ± 0.02 Vp-p

Note : Video Output terminal must be terminated at 75Ω.

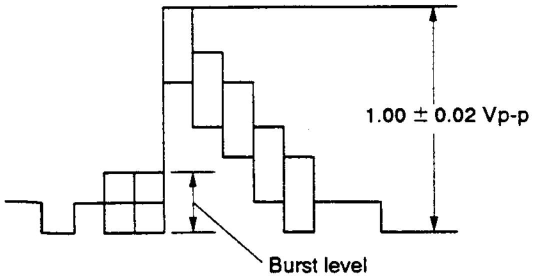


Fig. 7-2-9

Reference:

Adjusting level is low; The picture is darkened on TV screen.
Adjusting level is high; The picture is brightened on TV screen. White goes flat.

2-3-6. Carrier Deviation Adjustment (RV-33 Board)

Purpose:

Adjust FM modulating frequency for signal.
When it is out of order, black and white are over-modulated, interchangeability is lack, the screen is darkened or brightened or off.
This adjustment should be done after checking 2-3-5. Playback Level Adjustment is satisfied.

Carrier Set	
Mode	E-E
Signal	None
Measurement Point	Emitter of Q034
Measuring	Frequency Counter
Adjusting Element	RV006
Specifed Value	3.80 ± 0.05 MHz
Deviation	
Mode	REC. PB
Signal	Color bar
Measurement Point	VIDEO LINE
Measuring	Oscillosope
Adjusting Element	RV005
Specifed Value	1.00 ± 0.02Vp-p

Note : Video Output terminal must be terminated at 75Ω.

Adjusting Method:

1) Set to E-E mode in the no signal condition.
2) Connect frequency counter to emitter of Q034, and adjust with RV006 so that the reading on frequwncy counter goes 3.80 ± 0.05 MHz.
3) Feed the color bar signal and record it.
4) Playback the recorded signal and sheck the signal at VIDEO LINE OUT goes 1.00 ± 0.02 Vp-p with oscilloscope.
5) When it is out of order, adjustment it with RV005.
6) Repeat items 4) and 5) fill the specification is satisfied.

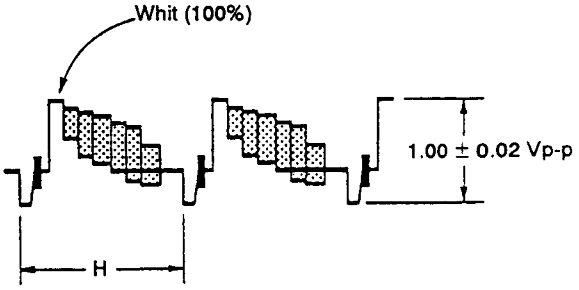


Fig. 7-2-10

2-3-7. VCO Adjustment (RV-33 Board)

Purpose:

Adjust to lock the color surely.
When it is out of order, the picture doesn't colored.

Mode	PB
Signal	Color bar
Measurement Point	Pin (55) of IC001
Measuring Instrument	Digital voltmeter
Adjusting Element	T001
Specified Value	2.5 ± 0.1 Vdc

2-3-8. SECAM Discrimination Adjustment (RV-33 Board)

Mode	E-E
Signal	SECAM Color bar
Measurement Point	Pin ⑪ of IC201
Measuring Instrument	oscilloscope
Adjusting Element	RV201
Specified Value	4.8 ± 0.1 Vp-p

Adjusting Method:

1) Adjust RV201 so that the amplitude of 1/2 fh waveform becames 4.8 ± 0.1 Vp-p.

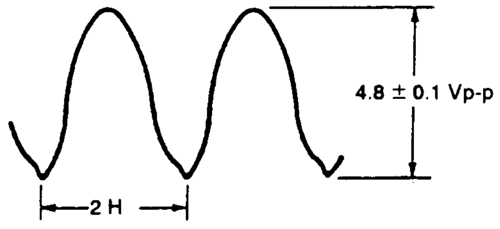


Fig. 7-2-11

2-3-9. VCO Frequency Adjustment (MA-203 Board)

Purpose:

Adjust to set the character position on the screen.

Mode	E-E
Signal	Color bar
Measurement Point	Pin ㉖ of IC601
Measuring Instrument	Oscilloscope (DC mode)
Adjusting Element	CT601
Specified Value	+2.45 ± 0.05 V

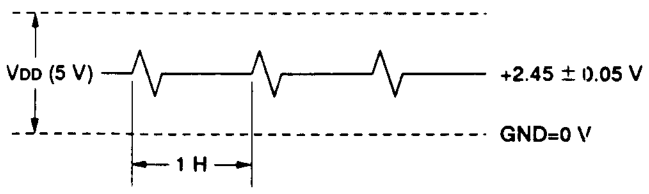

VDD (5 V)
+2.45 ± 0.05 V
GND=0 V
1 H

Fig. 7-2-12.

2-4. AUDIO SYSTEM ADJUSTMENTS

[Connection]

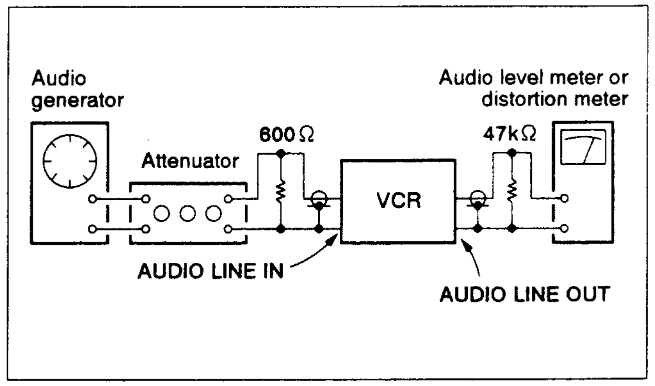

Audio generator
Audio level meter or distortion meter
Attenuator
600Ω
47kΩ
VCR
AUDIO LINE IN
AUDIO LINE OUT

Fig. 7-2-13.

2-4-1. Normal Audio System Adjustment

- Make adjustment in the SP mode, unless otherwise specified. Use a normal VHS cassette for an adjustment tape.
- Set AUDIO MONITOR to normal.

1. ACE Head Adjustment

Refer to the service manual of VHS MECHANICAL ADJUSTMENT Ⅲ.

2. Recording Bias Adjustment (MA-203 Board)

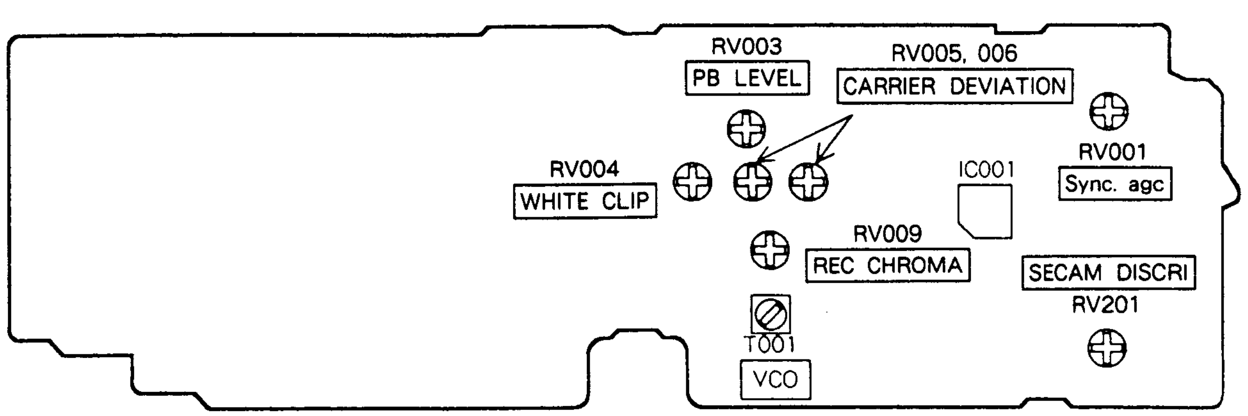
Mode	REC and PB
Signal	400 Hz, − 27.5 dBs 7 kHz, − 27.5 dBs
Measurement Point	AUDIO LINE OUT L or R
Measuring Instrument	Audio level meter
Adjusting Element	RV301
Specified Value	0 ± 1 dB

Adjusting Method:

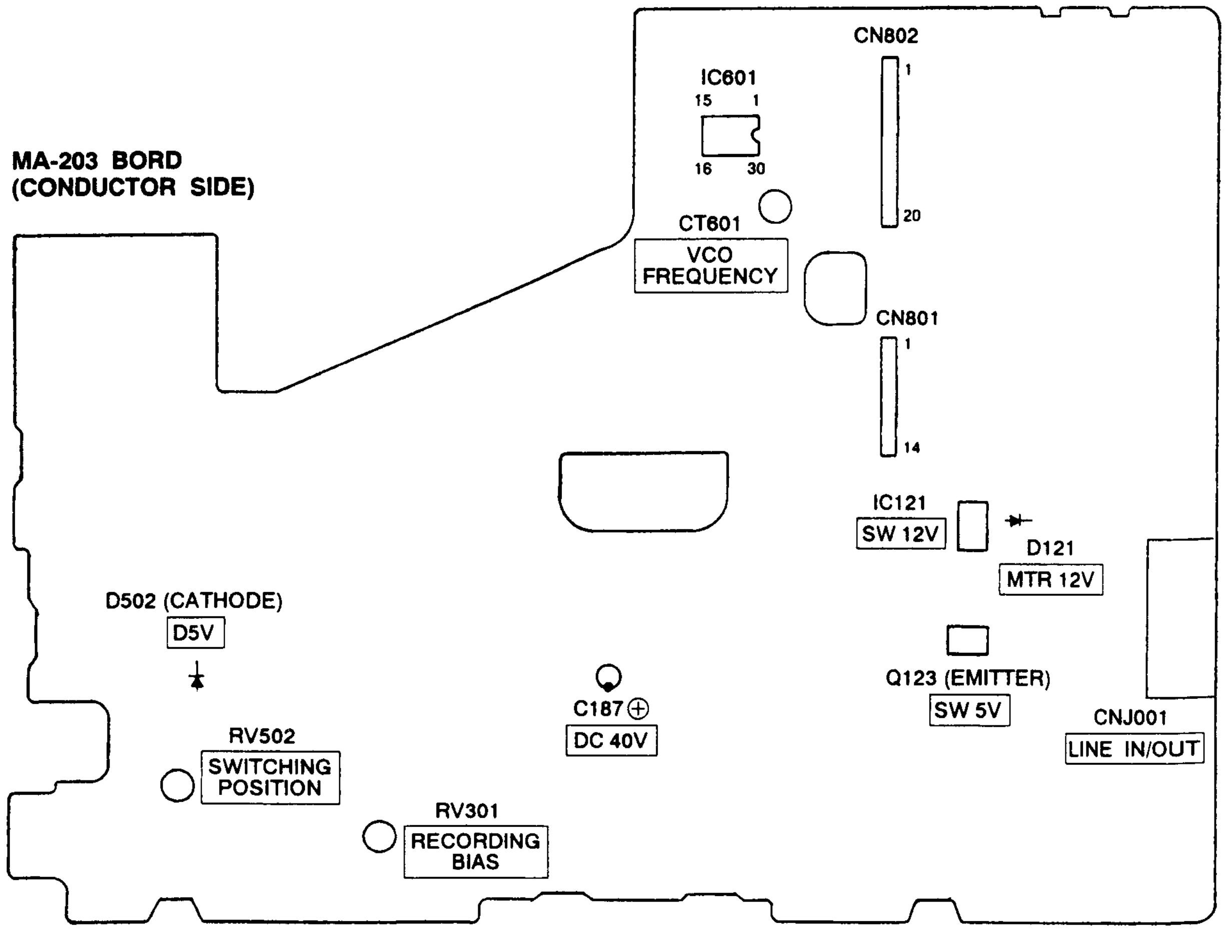
1) Supply a signal of 400 Hz, − 27.5 dBs to Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate − 27.5 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output levels within a range of the 400 Hz playback output level 0 ± 1 dB. When it is out of this range, sdjust RV301 and repeat the steps 1) through 7) above.

2-5. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENTS

RV-33 BOARD (COMPONENT SIDE)


RV003
PB LEVEL
RV005, 006
CARRIER DEVIATION
RV004
WHITE CLIP
IC001
RV001
Sync. agc
RV009
REC CHROMA
SECAM DISCRI
RV201
T001
VCO

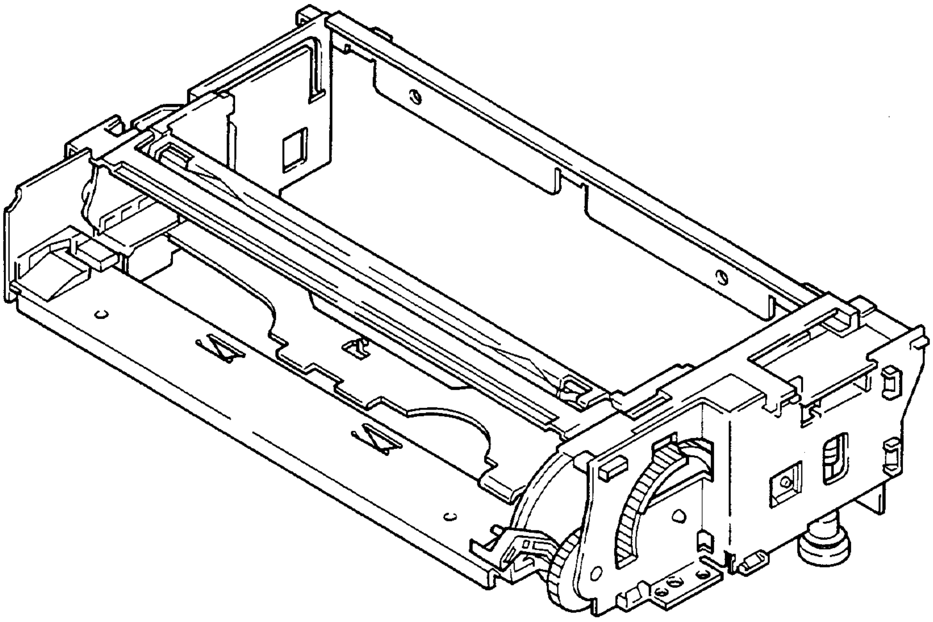
MA-203 BORD (CONDUCTOR SIDE)

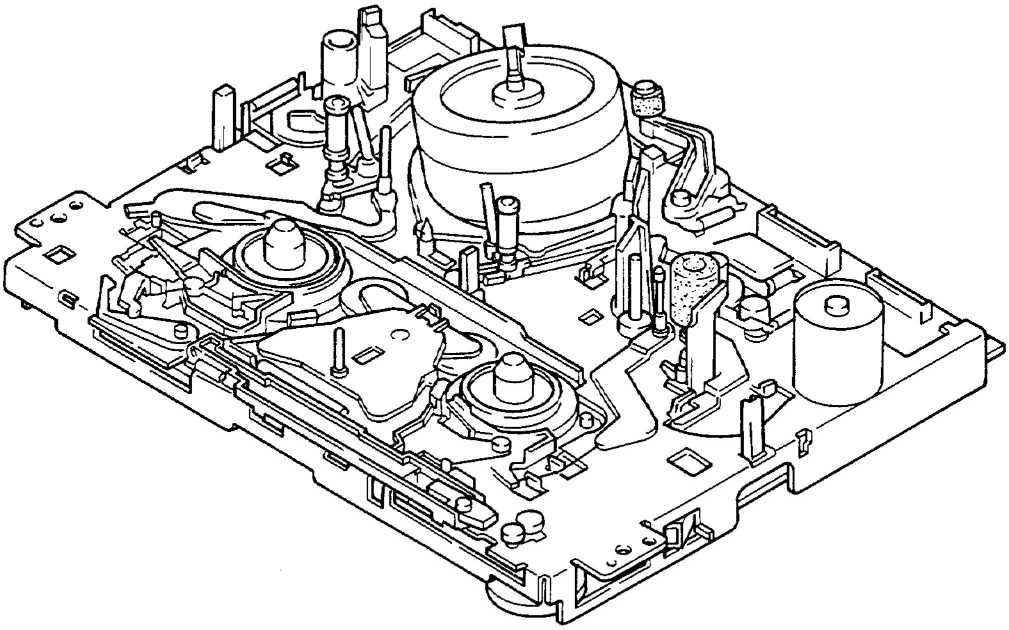

CN802
1
20
IC601
15 1
16 30
CT601
VCO FREQUENCY
CN801
1
14
IC121
SW 12V
D121
MTR 12V
D502 (CATHODE)
D5V
Q123 (EMITTER)
SW 5V
C187⊕
DC 40V
CNJ001
LINE IN/OUT
RV502
SWITCHING POSITION
RV301
RECORDING BIAS

VHS MECHANICAL ADJUSTMENT MANUAL III

●Please use in conjunction with the SERVICE MANUAL.

VIDE-V16179





VHS VIDEO RECORDER

SONY®

MICROFILM

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1. PREPARATIONS FOR CHECKS, ADJUSTMENTS AND REPLACEMENT OF THE DECK MECHANISM

Note : Refer to "Replacement Method" in the Service manual for instructions on replacing the cabinet and PC boards. DO not perform cassette loading or threading with the VCR positioned upside-down.

1-1. LOADING AND UNLOADING VIDEO CASSETTES WITH THE POWER OFF. (Fig. 1-1.)

1) Push the lock plate left and right in the direction of arrow Ⓐ and unlock the claws ❶. At the fully unlocked position, rotate the FL pulley in the direction of arrow Ⓑ. This operation should be done while pushing the tray lock levers, as the roller will be caught by the claws ❷.
2) When unloading, rotate the FL pulley in the direction of arrow Ⓒ.

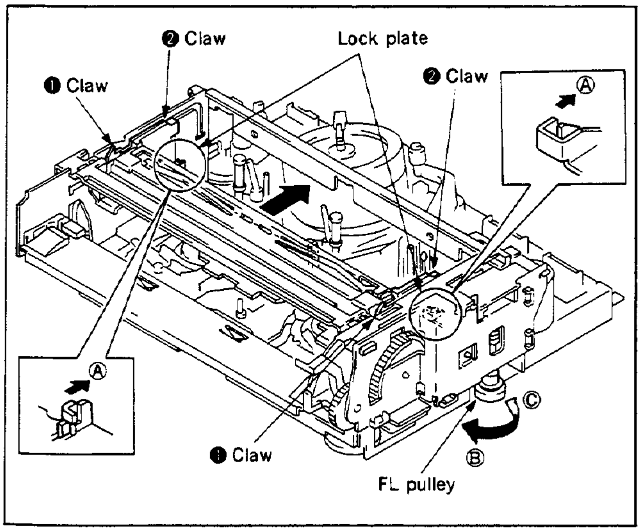


Fig. 1-1

1-2. THREADING AND UNTHREADING WITH THE POWER OFF. (Fig. 1-2)

1-2-1. Manual Threading and Unthreading

1) When threading tape, turn the loading pulley in the direction of arrow Ⓐ.
2) When unthreading tape, turn the loading pulley in the direction of arrow Ⓑ.

1-2-2. Threading and Unthreading Using a Separate Power Source.

1) Threading is performed by applying approx. 10V (500mA) to the power terminal for the loading motor ❶ using a DC stabilized power source.
2) When unthreading, apply the same voltage to the opposite polarity of the power terminal.

Note : After threading/unthreading has been completed, the motor should not be continued to be long applied with voltage.

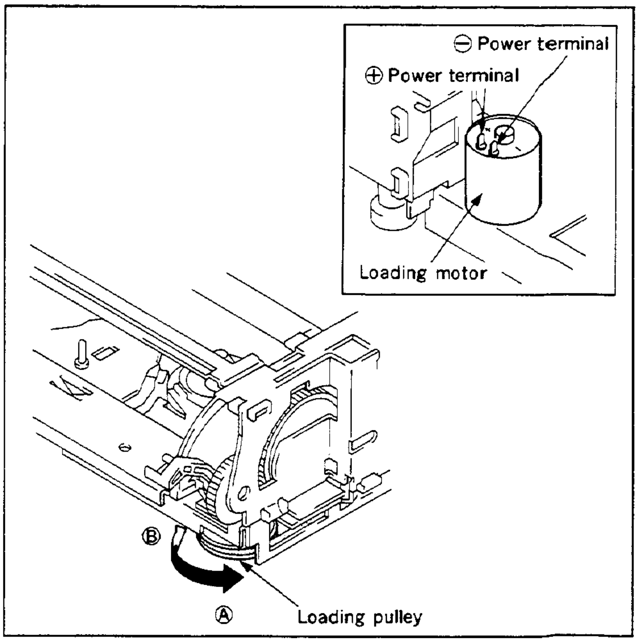


Fig. 1-2

1-3. HOW TO COMPLETE THREADING AND ENTER EACH MODE WITH FL ASS'Y REMOVED WHEN POWER IS ON

1) Pull out the power cord from an outlet.
2) Remove the FL ass'y. (Refer to 3-1. replacement of major parts and completely remove the FL belt from the eject pulley.)
3) Allow the F ass'y removed by performing the operation described in 1-1.1).
4) Plug in the power cord and turn the power ON.
   (This allows you to enter each mode.)

Note : It should be remembered that when the REC button is pressed without pressing the PROTECT button, the Eject mode will be entered.

2. PERIODICAL INSPECTION AND REPLACEMENT

We recommend performing the following periodical inspections and maintenance in order to ensure that the unit operates in top condition and offers full performance, as well as realizes a long life of the mechanism and tapes.

* Be sure to perform the following maintenance procedures after the usit is repaired (regardless how long the unit has been used.)

2-1. CLEANING OF ROTARY HEAD DISK ASS'Y

1) Press deer skin (Jig Ref. No. J-9) previously immersed in cleaning liquid (Jig Ref. No. J-8) lightly to the rotary drum ass'y, and turn the rotary head disk with hand slowly to clean the disk. (Never use the power motor to clean the disk by its rotation.)
2) Never move the deerskin vertically to the head chip when cleaning the disk. Otherwise, the head chip is very likely to be damaged.

2-2. CLEANING OF TAPE RUN SYSTEM

1) Clean the surfaces over which tape moves past (tape guide, drum assembly's surface, capstan pin, pinch roller, etc.) by using the deerskin previously immersed in the cleaning liquid and cotton swab.

2-3. CLEANING OF DRIVE SYSTEM

1) Clean the drive unit by using cloth moistened with the cleaning liquid.

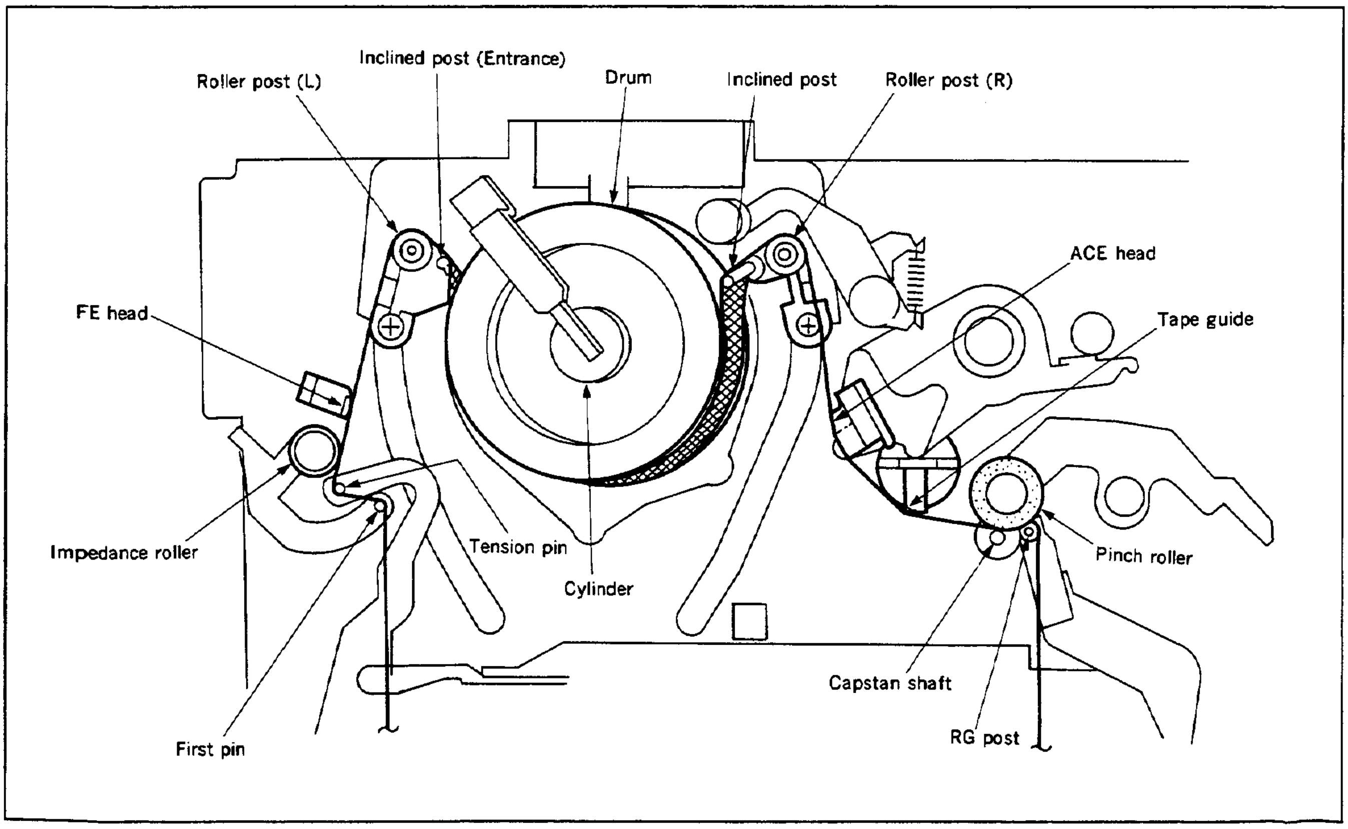

Inclined post (Entrance)
Roller post (L)
Drum
Inclined post
Roller post (R)
ACE head
FE head
Tape guide
Impedance roller
Tension pin
Cylinder
Pinch roller
Capstan shaft
RG post
First pin

Fig. 2-1

[Notes for Cleaning]

○ Use cleaning liquid and cotton swab. Be careful not to dirt and damage them.

○ After cleaning the cylinder, be careful not to allow the grounding bar contact to lift. (Fig. A)

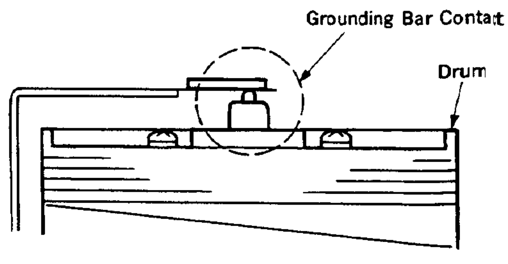

Grounding Bar Contact
Drum

Fig. A

2-4. PERIODIC MAINTENANCE

User Hours Location of Maintenance and Check			500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks	
Performance Check	Clean tape running surfaces		○	○	○	○	○	○	○	○	○	○	Always perform after repair.	
	Clean, degauss ACE ass'y		○	○	○	○	○	○	○	○	○	○		
	Clean, degauss video disc ass'y		○	○	○	○	○	○	○	○	○	○	Head life is greatly affected by environment and method of use.	
Driving System	Reel belt		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Always perform after repair.	
Tape Running System	Abnormal noise		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace source of abnormal noise.	
	Tension torque measurement	Playback	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Spec : 100±30g·cm	Check according to 4-1-4. (Measured with torque cassette)
		Back tension	—	☆	—	☆	—	☆	—	☆	—	☆	Spec : 47.5±12.5g·cm	
		REV	—	☆	—	☆	—	☆	—	☆	—	☆	Spec : 165±25g·cm	
		CUE	—	☆	—	☆	—	☆	—	☆	—	☆	Spec : 115±45g·cm	
	Brake system check		—	☆	—	☆	—	☆	—	☆	—	☆	Check according to 4-1-5.	
	REC/PB function check		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Always perform after repair.	

○ Cleaning ☆ Check

Note : Refer to the above items for part replacement when performing an overhaul.

2-5. SERVICE TOOLS AND JIGS

Ref. No.	Description	Part No.	Printing on jig	Remarks
J-1	Master plane	H-7099-279-H		
J-2	Reel disc height jig	H-7099-038-H		
J-3	Torque gauge adapter	H-7099-035-H		
J-4	Torque gauge	H-7099-039-H		
J-5	0.93mm Allen wrench	H-7099-202-H		
J-6	NTSC torque cassette VHT-063S PAL torque cassette VHT-066S	J-6082-011-A J-6082-066-A		For rewind torque and back tension
	NTSC torque cassette VHT-404S PAL torque cassette VHT-404S	J-6082-012-A J-6082-067-A		For cue/review
J-7	NTSC alignment tape JVC-MH-1 PAL alignment tape JVC-MH-2	H-7099-046-H H-7099-052-H		
	NTSC Hi-Fi alignment tape PAL Hi-Fi alignment tape	H-7099-153-H H-7099-175-H		
J-8	Cleaning fluid	Y-2031-001-0	——	
J-9	Chamois cloth	2-034-697-00	——	Cleaning
J-10	Head degausser	Widely available	——	Video, audio head degaussing
J-11	Small adjustment mirror (with handle) Small adjustment mirror (mirror only)	J-6080-029-A J-6080-030-1	SL-5052	For tape path and tape running adjustment and check

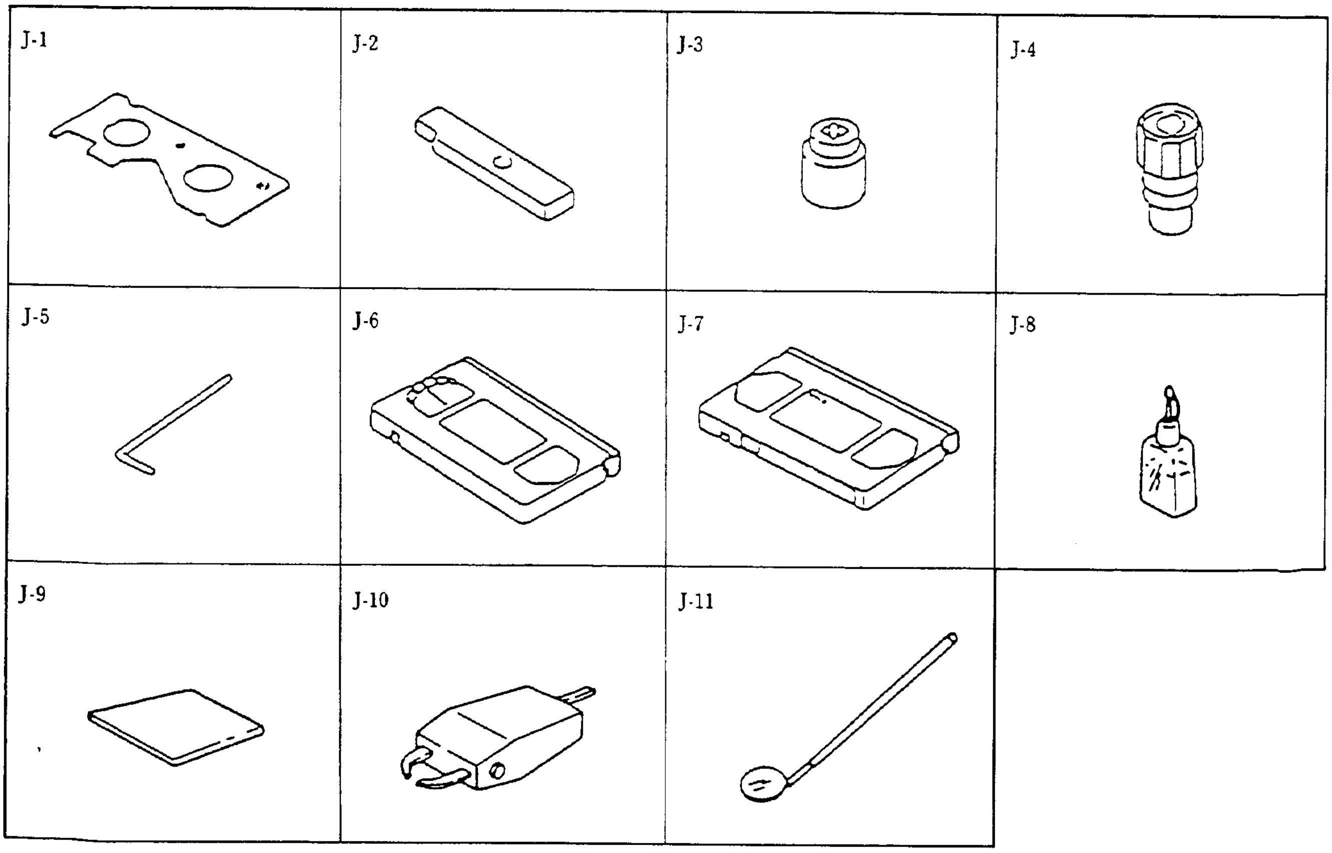


Fig. 2-2. Service tools and jigs

3. REPLACEMENT OF MAJOR COMPONENT PARTS OF THE DECK MECHANISM

Note : ○ Refer to "Replacement Method" in the Service Guide for replacing the cabinet and PC boards.

○ When mounting parts, reverse the replacement procedure while referring to "Precautions on Mounting Parts".

○ After grease coated parts such as gears are replaced, regrease the replaced part.

○ Do not touch the guides (taped surface) and brake shoe directly with your fingers or grease them, etc.

○ Gears must be mounted so that they mesh with each other.

3-1. FL ASS'Y (Fig. 3-1)

1) Remove two screws ❶.
2) Remove the FL bert ❷ and hook the belt on Ⓔ part.
3) Slide the FL ass'y ❸ in the direction of arrow Ⓐ and remove the assembly in the direction of arrow Ⓑ.

[Precautions on remounting]

○ When installing the FL ass'y ❸, ensure that Ⓒ part is firmly engaged with Ⓓ part.

○ When installing the FL ass'y ❸, put the FL belt ❷ on the FL pulley Ⓕ.

○ Take care that the FL belt is free from twist and dirt.

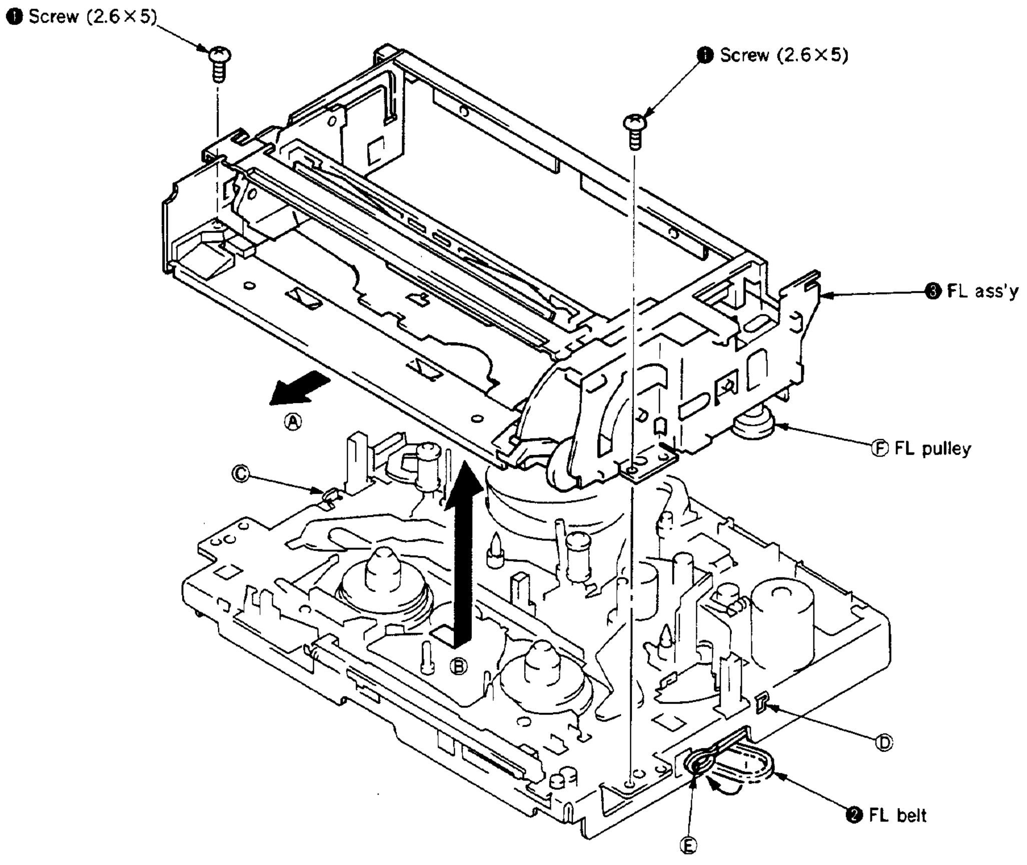


Fig. 3-1

3-1-1. Frame Cover, Switch Arm, Worm Wheel, Lift Gear (R) Ass'y, Switch Lever and Lift Lever Ass'y (Fig. 3-2)

1) Remove screw ❶ and remove the collar ❷.
2) Undo six claws ❸ and remove the frame cover ❹ in the arrow direction.
3) Remove the FL PWB B ass'y ❺.
4) Remove the switch arm ❻ and pull out the worm wheel ❼ in the arrow direction.
5) Undo two claws ❽ and remove the switch lever ❾ in the arrow direction.
6) Pull out the left gear (R) ass'y ❿ in the arrow direction.
7) Remove the synchro gear ⓫ from the slot of Ⓔ part.
8) Undo the claw ⓬, then remove the spring ⓮ and the lift lever ass'y ⓭.

[Precautions on remounting]

1) Before installing the lift lever ass'y ⓭, first install the spring ⓮ to the assembly. (Fig. B)
2) Engage claw Ⓕ on the lift lever ass'y with Ⓖ part and insert the assembly.
3) After installation, remove the spring from the claw Ⓗ and hook it onto the chassis. (Fig. B)
4) When installing the synchro gear ass'y ⓫ and the lift gear (R) ass'y ❿, align register marks and have teeth engaged. (Fig. A)
5) When installing the lift gear (R) ass'y ❿ and the worm wheel ❼, align register marks and have teeth engaged. (Fig. A)
6) When installing the switch lever ❾, place the switch Ⓘ in between two claws Ⓙ as shown in Fig. C.
7) When installing the switch arm ❻, position the switch arm ❻ with respect to claw Ⓛ on Ⓚ part as shown in Fig. D.
8) The tightening torque for screw ❶ should be 1000g·cm.
9) When installing the frame cover ❹, align the axles of the synchro gear ass'y ⓫, lift gear (R) ass'y ❿ and worm wheel ❼ with their corresponding holes in the frame cover and insert them. (Fig. A)

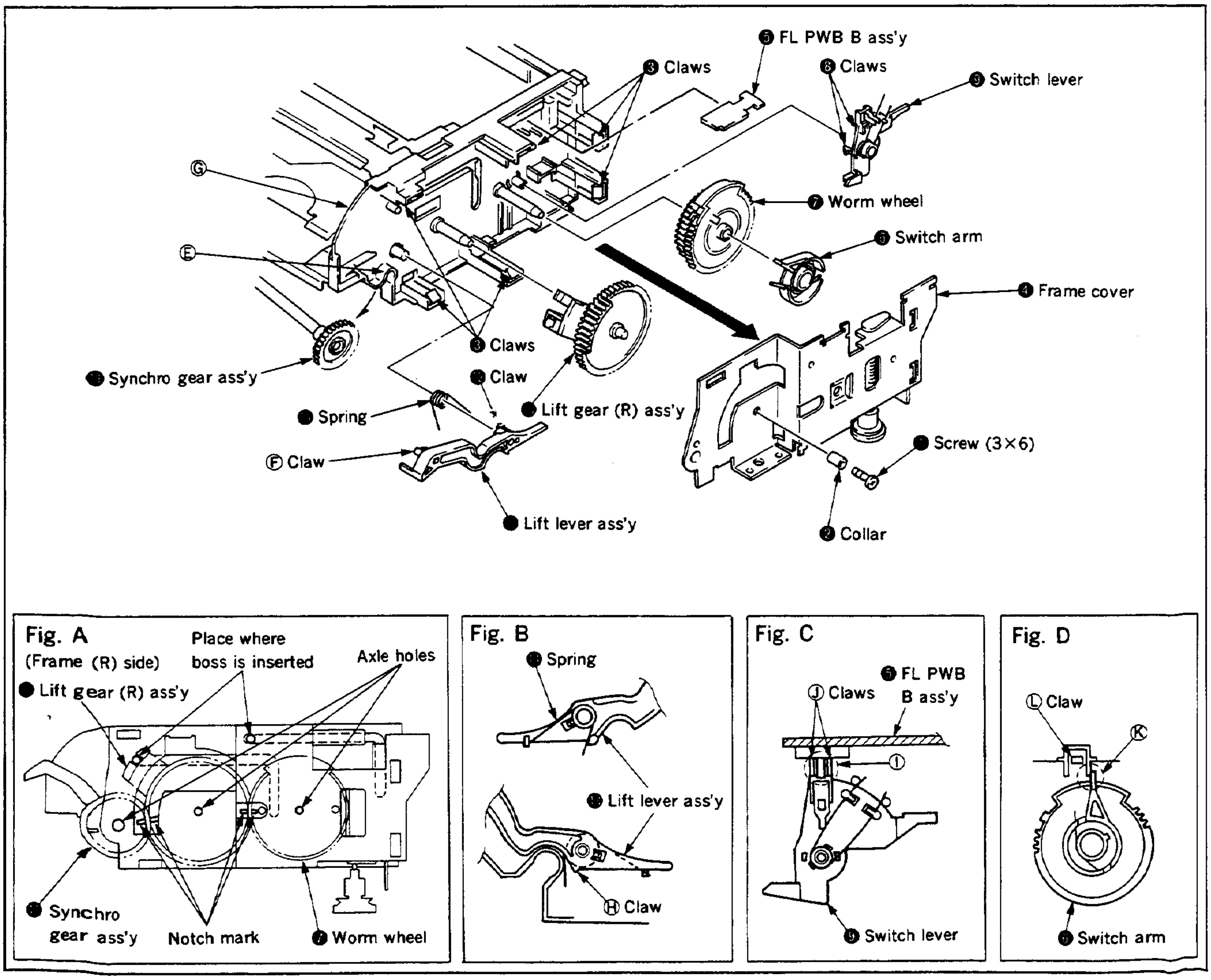

❺ FL PWB B ass'y
❸ Claws
❽ Claws
❾ Switch lever
Ⓖ
❼ Worm wheel
❻ Switch arm
Ⓔ
❹ Frame cover
❸ Claws
⓫ Synchro gear ass'y
⓬ Claw
⓮ Spring
❿ Lift gear (R) ass'y
❶ Screw (3×6)
Ⓕ Claw
⓭ Lift lever ass'y
❷ Collar
Fig. A
(Frame (R) side)
Place where boss is inserted
Axle holes
❿ Lift gear (R) ass'y
⓫ Synchro gear ass'y
Notch mark
❼ Worm wheel
Fig. B
⓮ Spring
⓭ Lift lever ass'y
Ⓗ Claw
Fig. C
❺ FL PWB B ass'y
Ⓙ Claws
Ⓘ
❾ Switch lever
Fig. D
Ⓛ Claw
Ⓚ
❻ Switch arm

Fig. 3-2

3-1-2. Lift Gear (L) Ass'y (Fig. 3-3)

1) Place the cassette holder ass'y ❶ in the loading state as instructed in Section 1-1.
2) Undo two claws and pull out the lift gear (L) ass'y ❸.

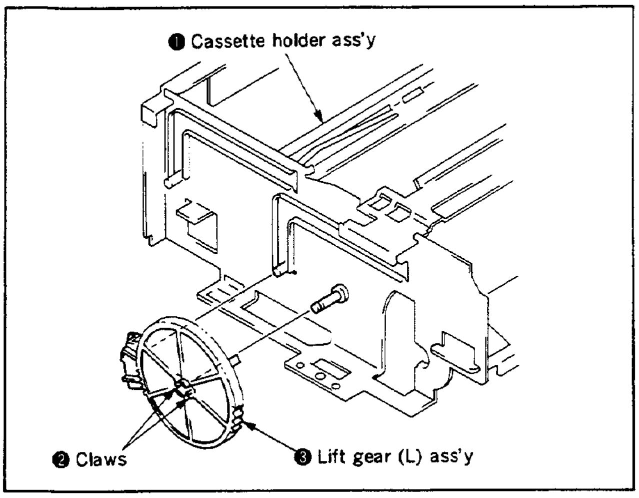

❶ Cassette holder ass'y
❷ Claws
❸ Lift gear (L) ass'y

Fig. 3-3

[Precautions on remounting]

○ When installing the synchro gear ass'y and the lift gear (L) ass'y ❸, align register marks and have teeth engaged. (Fig. 3-4)

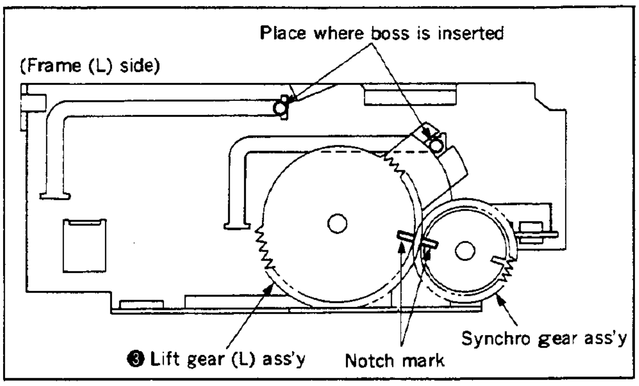

Place where boss is inserted
(Frame (L) side)
❸ Lift gear (L) ass'y
Notch mark
Synchro gear ass'y

Fig. 3-4

3-1-3. Upper Plate, Rear Angle, Cassette Guide (L), Cassette Holder Ass'y, Frame (L) Caulking and Synchro Gear Ass'y (Fig. 3-5)

1) Place the cassette holder ass'y ❼ in the loading state as instructed in section 1-1.
2) Remove two screws ❶.
3) Undo two claws ❷ and pull out the upper plate ❸ and the rear angle ❹ from the frame (R) ⓬.
4) Undo the claw ❺ and remove the cassette guide (L) ❻.
5) Remove the cassette holder ass'y ❼.
6) Undo the claw ❽ and pull out the front angle ❾ from the frame R ⓬.
7) Remove the frame (L) caulking ❿ and remove the synchro gear ass'y ⓫ in the arrow direction.

[Precautions on remounting]

○ When installing the frame (L) caulking ❿, check to make sure that two bosses are fit into the slot ❿ on the caulk. (Section 3-1-3, Fig 3-5)

○ When installing the frame (R) ⓬, check to make sure that two bosses are fit into the slot ⓬ on the frame. (Section 3-1-3, Fig 3-5)

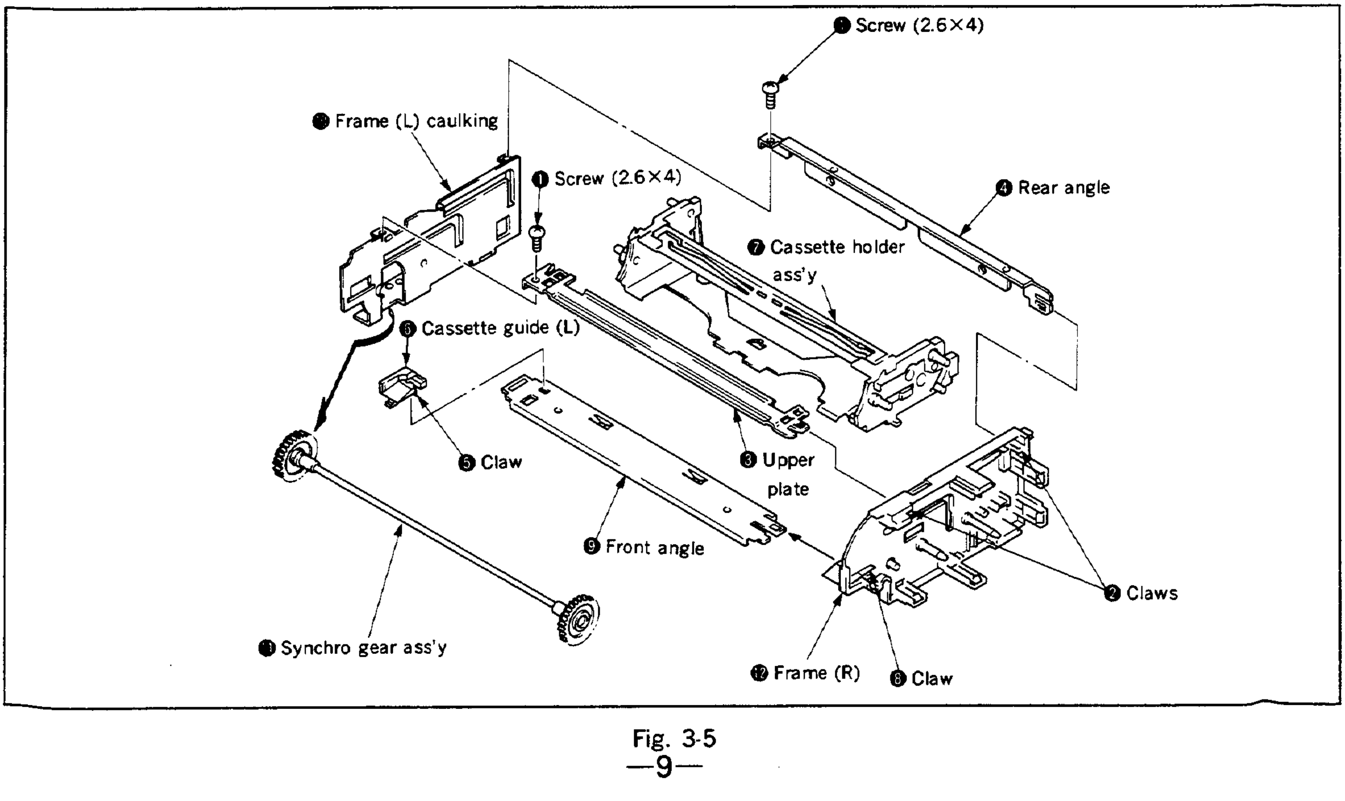

❶ Screw (2.6×4)
❿ Frame (L) caulking
❶ Screw (2.6×4)
❹ Rear angle
❼ Cassette holder ass'y
❻ Cassette guide (L)
❺ Claw
❸ Upper plate
❾ Front angle
❷ Claws
⓫ Synchro gear ass'y
⓬ Frame (R)
❽ Claw

Fig. 3-5

3-2. FE BASE ASS'Y (Fig. 3-6)

1) Remove the DM lead wire ❶.
2) Undo two claws ❷ and remove the PWB joiner ❸.
3) Remove screw ❹.
4) Undo two claws ❺ on the sensor and lift in the direction of the arrow Ⓑ.
5) Take off the PWB board ❻ in the direction of the arrow Ⓒ, then lift the board in the direction of arrow Ⓓ and remove it.
6) Remove spring ❼.
7) Align the FE base ass'y ❽ with the slot Ⓕ, then turn the assembly in the arrow direction and remove it.

[Precautions on remounting]

- ○ When installing the FE base ass'y ❽, align the three claws Ⓔ with the slot Ⓕ and insert the assembly fully.
- ○ When installing the PWB joiner ❸, clean the board pattern side with alcohol or other solvent. be careful not to deform the brush.
- ○ Keep the impedance roller and FE head surfaces clean. do not touch them directly with fingers or tool.

[Adjustment after replacement]

- ○ Perform tape path adjustments as described in 4-1.

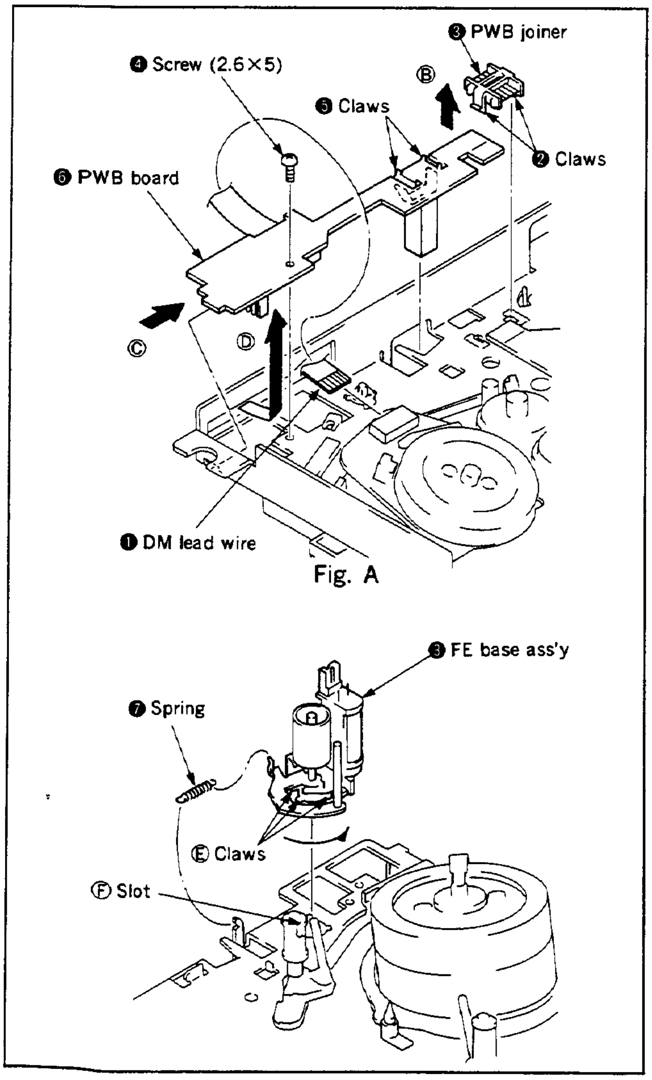

❸ PWB joiner
❹ Screw (2.6×5)
Ⓑ
❺ Claws
❷ Claws
❻ PWB board
Ⓒ
Ⓓ
❶ DM lead wire
Fig. A
❽ FE base ass'y
❼ Spring
Ⓔ Claws
Ⓕ Slot

Fig. 3-6

3-3. CLEANING LEVER ASS'Y (Fig. 3-7)

1) Undo two claws ❶ and pull out the cleaning lever ass'y ❷.

[Precautions on remounting]

- ○ When installing the cleaning lever ass'y ❷, ensure that spring Ⓐ is secured with hook Ⓑ (Fig. A).

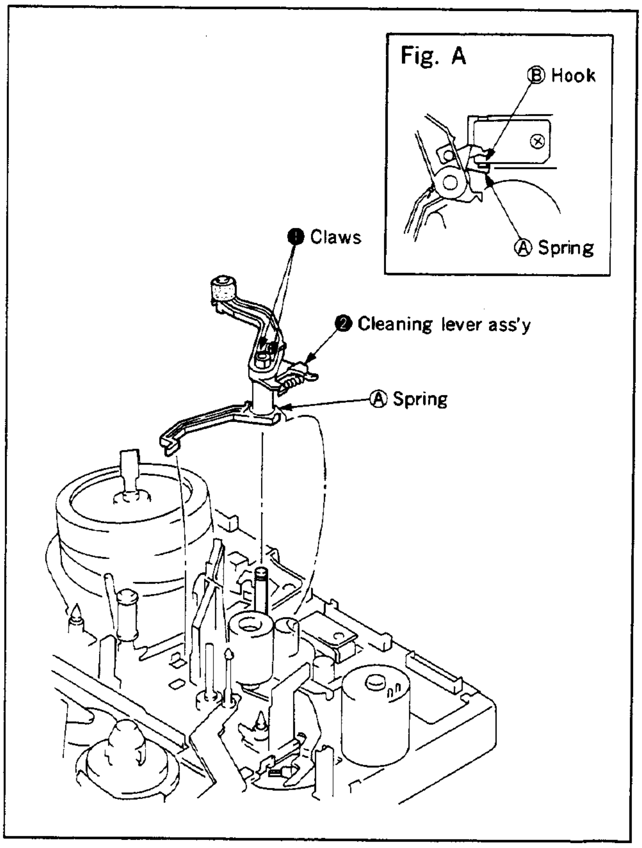


Fig. A
Ⓑ Hook
Ⓐ Spring
❶ Claws
❷ Cleaning lever ass'y
Ⓐ Spring

Fig. 3-7

3-4. P ROLLER ARM ASS'Y (Fig. 3-8)

1) Remove the washer ❶.
2) Unfasten the P arm spring ❷ from the hook Ⓑ and pull out the P roller arm ass'y ❸.

[Precautions on remounting]

○ Ensure that the P arm spring ❷ is secured with hook Ⓑ (Fig. A).

○ Take care to prevent the P arm spring ❷ from overriding the shaft seat Ⓒ.

○ When installing the P roller arm ass'y ❸, place the assembly on the right side of hook Ⓓ (Fig. A).

○ Removed washers should not be reused.

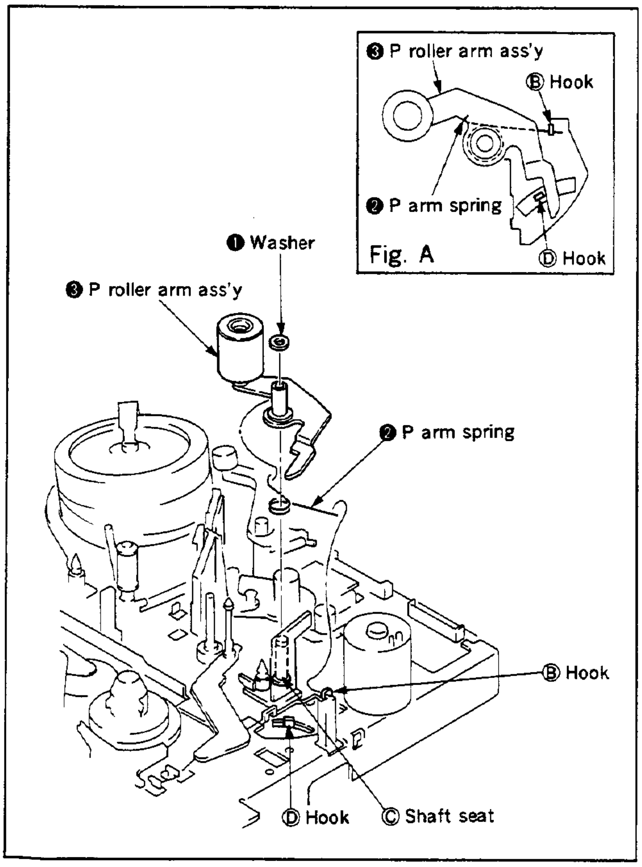

❸ P roller arm ass'y
Ⓑ Hook
❷ P arm spring
Fig. A
Ⓓ Hook
❶ Washer
❸ P roller arm ass'y
❷ P arm spring
Ⓑ Hook
Ⓓ Hook
Ⓒ Shaft seat

Fig. 3-8

3-5. AH BASE ASS'Y (Fig. 3-9)

1) Remove the cleaning lever ass'y as instructed in Section 3-3.
2) Remove the ADJ spring ❶.
3) Remove the screw ❷.
4) Pull out the AH base ass'y ❸ and remove the AH base spring ❹.

[Precautions on remounting]

○ Ensure that the ADJ spring ❶ is secured with hook Ⓐ.

○ When installing the AH base ass'y ❸, tighten screw ❷ until the AH base ass'y is not in contact with the P roller ass'y.

[Adjustment after replacement]

○ Perform tape path adjustments as described in 4-1.

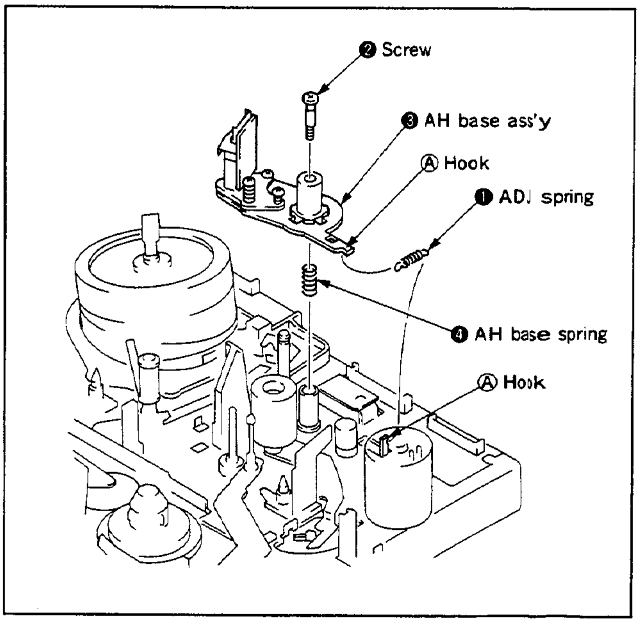

❷ Screw
❸ AH base ass'y
Ⓐ Hook
❶ ADJ spring
❹ AH base spring
Ⓐ Hook

Fig. 3-9

3-6. L MOTOR ASS'Y (Fig. 3-10)

1) Remove the loading belt ❶ with it put on the loading pulley Ⓑ. (This is to prevent damage to the belt.)
2) Remove the connector ❷.
3) Remove two screws ❸ and remove the L motor ass'y ❹.

[Precautions on remounting]

- ○ When installing the L motor ass'y ❹, put the loading belt ❶ on the loading pulley Ⓑ (Fig. A).
- ○ Install the L motor ass'y ❹ so that the L motor label is on the front side.
- ○ Take care that the loading belt is free from twist and dirt.

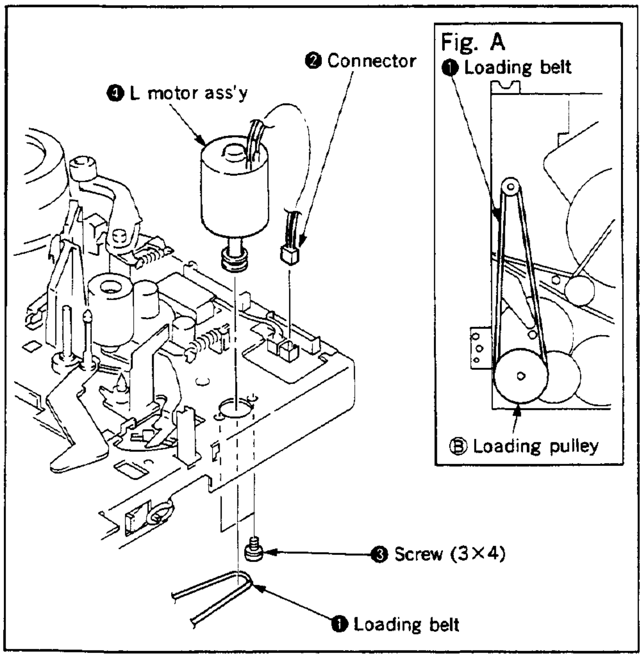

❷ Connector
❹ L motor ass'y
Fig. A
❶ Loading belt
Ⓑ Loading pulley
❸ Screw (3×4)
❶ Loading belt

Fig. 3-10

3-7. DRUM ASS'Y (Fig. 3-11)

1) Remove the cleaning lever ass'y as instructed in Section 3-3.
2) Remove the DM lead wire ❶.
3) Remove three screws ❷ and remove the drum ass'y ❸ in the arrow direction.

[Precautions on remounting]

- ○ Do not to touch the tape contact surfaces of the head chip Ⓐ and drum ass'y ❸ directly by fingers and tooling.
- ○ When tightening screws ❷, take care to prevent screws from projecting and slanting.
- ○ Take care to avoid bent and damage of the DM lead wire ❶.
- ○ When inserting the lead wire terminal Ⓑ into the board connector Ⓒ, ensure that the terminal is firmly inserted.
- ○ The tightening torque for screw ❷ should be 7500g•cm.

[Adjustment after replacement]

- ○ Perform tape path adjustments as described in 4-1.

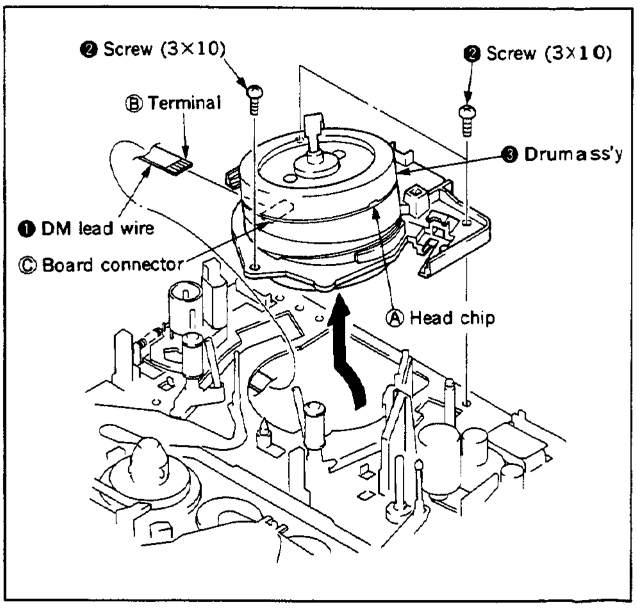

❷ Screw (3×10)
❷ Screw (3×10)
Ⓑ Terminal
❸ Drum ass'y
❶ DM lead wire
Ⓒ Board connector
Ⓐ Head chip

Fig. 3-11

3-8. L BLOCK (L, R) ASSEMBLIES, ROLLER POST (Fig. 3-12)

1) Remove screw ❶ and remove the loading boss ❷.
2) Slide the L block (L) ass'y ❸ in the direction of arrow Ⓐ and remove the assembly in the direction of arrow Ⓑ.
3) Remove the screw ❹ and remove the loading boss ❺.
4) Slide the L block (R) ass'y ❻ in the direction of arrow Ⓒ and remove the assembly in the direction of arrow Ⓓ.
5) When removing the roller post ❼, loosen the screw ❽, then turn the post in the direction of arrow Ⓔ and pull out it.

[Precautions on remounting]

○ Keep clean the tape contact surface of the roller post ❼. Do not touch the contact surface directly by fingers and tooling.

[Adjustment after replacement]

○ Perform tape path adjustments as described in 4-1.

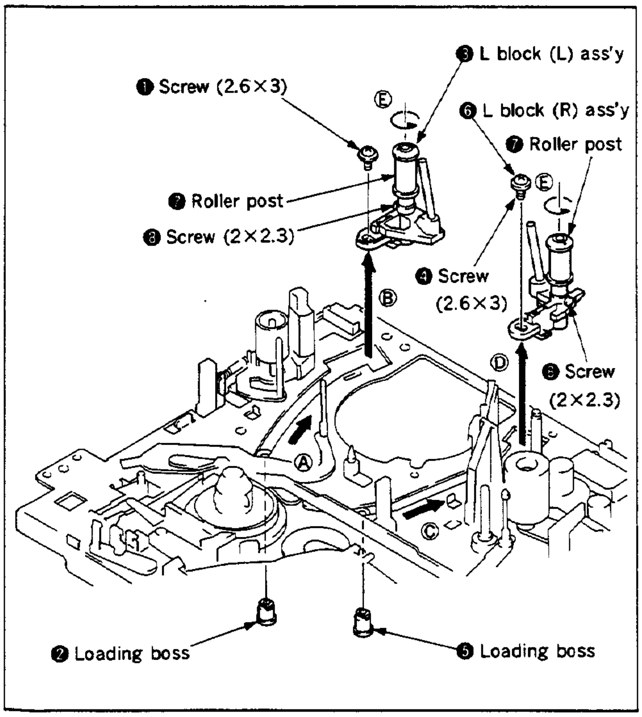

❸ L block (L) ass'y
❶ Screw (2.6×3)
Ⓔ
❻ L block (R) ass'y
❼ Roller post
❼ Roller post
Ⓔ
❽ Screw (2×2.3)
❹ Screw (2.6×3)
Ⓑ
Ⓓ
❽ Screw (2×2.3)
Ⓐ
Ⓒ
❷ Loading boss
❺ Loading boss

Fig. 3-12

3-9. TENSION ARM ASS'Y, BT BAND ASS'Y (Fig. 3-13)

1) Remove the BT pull up plate as instrcted in section 3-18.
2) Remove the BT spring ❶.
3) Remove the screw ❷.
4) Remove two claws ❸, then push the S soft brake ❹ in the direction of arrow Ⓐ and pull out the tension arm ass'y ❺.
5) Turn the claw ❻ in the direction of arrow Ⓑ and remove the BT band ass'y ❼.

[Precautions on remounting]

○ Before installing the tension arm ass'y ❺, install the BT band ass'y ❼ to the tension arm ass'y ❺.

○ When installing the tension arm ass'y ❺, ensure that the arm shaft Ⓒ is firmly fit into the arm metal Ⓓ.

○ When installing the BT band ass'y ❼, insert the projection Ⓔ into the hole Ⓕ.

[Adjustment after replacement]

○ Perform tape path adjustments as described in 4-1.

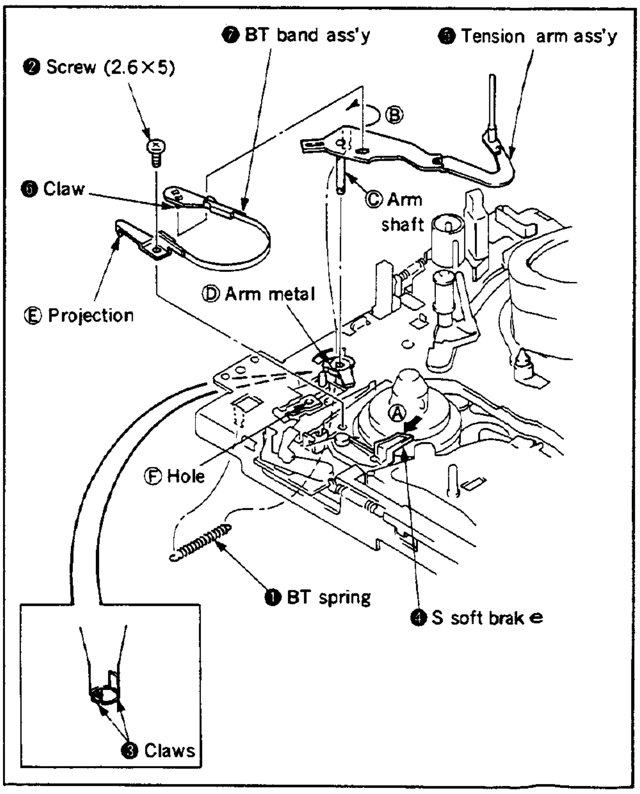

❼ BT band ass'y
❺ Tension arm ass'y
❷ Screw (2.6×5)
Ⓑ
❻ Claw
Ⓒ Arm shaft
Ⓔ Projection
Ⓓ Arm metal
Ⓐ
Ⓕ Hole
❶ BT spring
❹ S soft brake
❸ Claws

Fig. 3-13

3-10. RG ARM ASS'Y (Fig. 3-14)

1) Unfasten two claws ❶ and pull out the RG arm ass'y ❷.

[Precautions on remounting]

○ When installing the RG arm ass'y ❷, fit the projection Ⓐ on the right side of the spring Ⓑ.

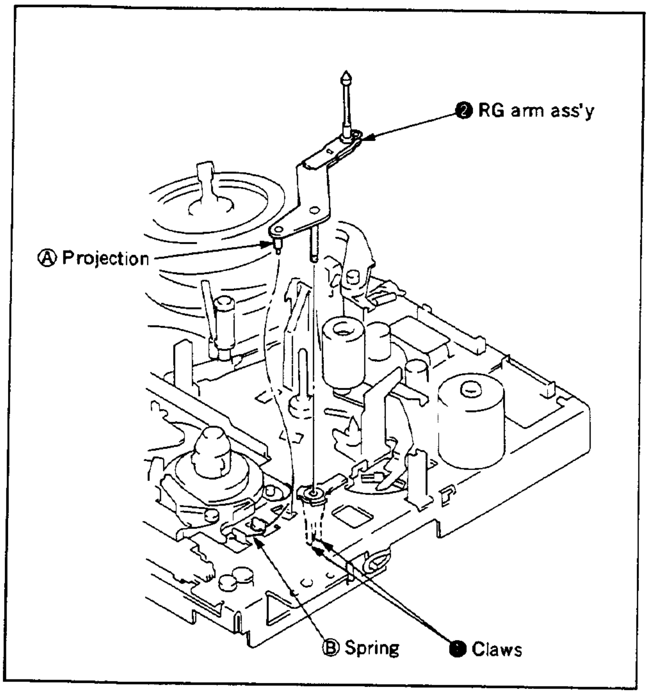

❷ RG arm ass'y
Ⓐ Projection
Ⓑ Spring
❶ Claws

Fig. 3-14

3-11. SS BRAKE ARM, TS BRAKE ARM, REEL TABLE ASS'Y (Fig. 3-15)

1) Remove the washer ❶.
2) Unfasten the arm spring ❸ from the hook ❷ and pull out the SS brake arm ❹.
3) Pull out the reel table ass'y ❺ and pull out the washer ❻.
4) Remove the washer ❼.
5) Unfasten the arm spring ❾ from the hook ❽ and pull out the TS brake arm ❿.
6) Push the brake arm (R) ass'y ⓫ in the direction of arrow Ⓐ and pull out the reel table ass'y ⓬. Then pull out the washer ⓭.

[Precautions on remounting]

○ Do not touch the felt surface of the TS brake arm ❿ directry with fingers or tool.

○ Removed washers should not be reused.

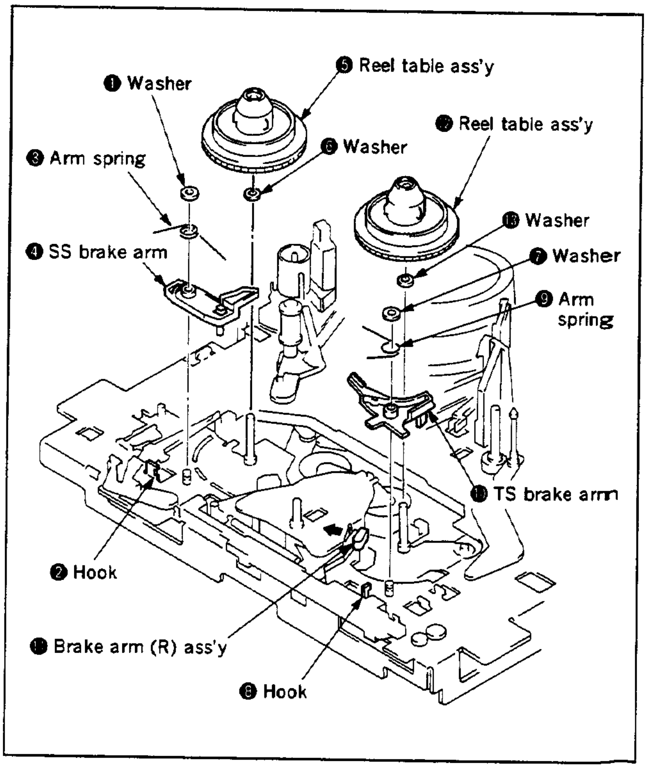

❺ Reel table ass'y
❶ Washer
⓬ Reel table ass'y
❻ Washer
❸ Arm spring
⓭ Washer
❹ SS brake arm
❼ Washer
❾ Arm spring
❿ TS brake arm
❷ Hook
⓫ Brake arm (R) ass'y
❽ Hook

Fig. 3-15

3-12. SUB PLATE ASS'Y, BRAKE (L, R) ASS'Y (Fig. 3-16)

1) Remove the drive belt ❶.
2) Remove two screws ❷.
3) Remove the brake arm spring ❸.
4) Raise the sub plate ass'y ❹ in the direction of arrow Ⓑ and unfasten the claw ❺, then lift the assembly in the direction of arrow Ⓒ to remove it.
5) Remove the brake (L) ass'y ❻ and brake (R) ass'y ❼.

[Precautions on remounting]

- ○ When installing the sub plate ass'y ❹, ensure that the drive belt ❶ is firmly put on the pulley groove Ⓓ (Fig. A).
- ○ Be careful not to damage the gears.
- ○ Take care that the drive belt ❶ is free from twist or dirt.

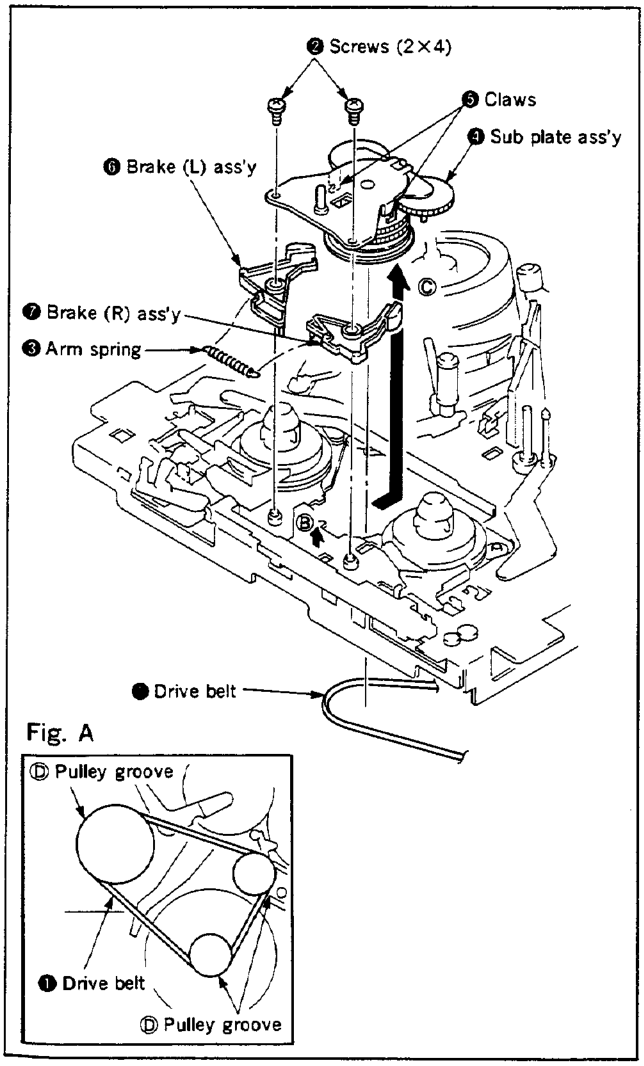

❷ Screws (2×4)
❺ Claws
❹ Sub plate ass'y
❻ Brake (L) ass'y
Ⓒ
❼ Brake (R) ass'y
❸ Arm spring
Ⓑ
● Drive belt
Fig. A
Ⓓ Pulley groove
❶ Drive belt
Ⓓ Pulley groove

Fig. 3-16

3-13. BK SLIDE PLATE, REC ARM, REC SWITCH ARM (Fig. 3-17)

1) Remove the parts as instructed in Sections 3-9 and 3-12.
2) Unfasten two claws ❶ and remove the REC switch arm ❷.
3) Remove the arm spring ❸, then turn the REC arm ❹ in the direction of arrow Ⓒ and remove the arm.
4) Remove the BK trigger hook ❺.
5) Remove the slide spring ❻.
6) Undo the BK slide plate ❼ from the projection Ⓖ, then slide the plate in the direction of arrow Ⓓ and remove it.

[Precautions on remounting]

- ○ Take care not to wrongly fit the long and short portions of the arm spring ❸ (Fig. B).
- ○ Ensure that the REC switch arm ❷ is firmly fit on the REC switch (Fig. A).
- ○ When installing the BK slide plate ❼, insert the projections Ⓖ and Ⓙ into the holes Ⓗ and Ⓘ respectively and fit the claw Ⓔ into the slots Ⓕ, then slide the plate.
- ○ Be careful not to damage the gears.

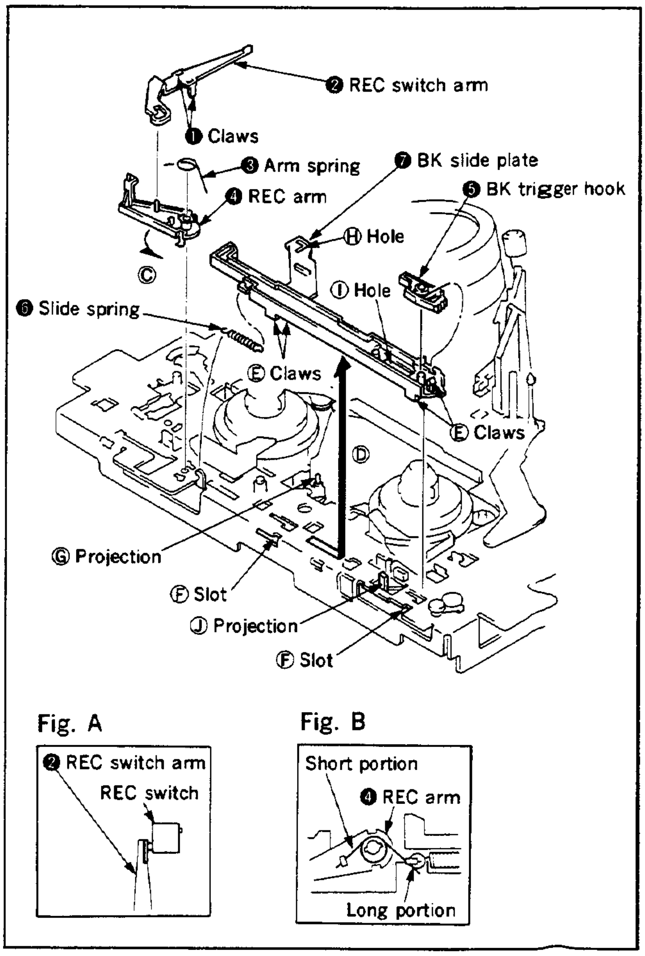

❷ REC switch arm
❶ Claws
❸ Arm spring
❹ REC arm
❼ BK slide plate
❺ BK trigger hook
Ⓗ Hole
Ⓒ
Ⓘ Hole
❻ Slide spring
Ⓔ Claws
Ⓔ Claws
Ⓓ
Ⓖ Projection
Ⓕ Slot
Ⓙ Projection
Ⓕ Slot
Fig. A
❷ REC switch arm
REC switch
Fig. B
Short portion
❹ REC arm
Long portion

Fig. 3-17

3-14. MOTOR (Fig. 3-18)

1) Remove the drive belt as instructed in Section 3-12.
2) Unfasten two claws ❶ and lift the CM lead connector ❷ in the arrow direction.
3) Pull out the terminal ❸ and remove the CM lead connector ❷.
4) Remove three screws ❹.
5) Remove the motor ❺.

[Precautions on remounting]

- ○ Keep clean the contact Ⓐ of the flexible board.
- ○ Insert the CM lead connector terminal ❸ fully with care not to damage it.
- ○ When tightening screws ❹, use the DD motor stand to firmly tighten the screws so that screws may not project and slant. (Use the screw tightening torque of 5500g•cm.)
- ○ Be careful not to contaminate the DD capstan.

[Adjustment after replacement]

- ○ Perform tape path adjustments as described in 4-1.

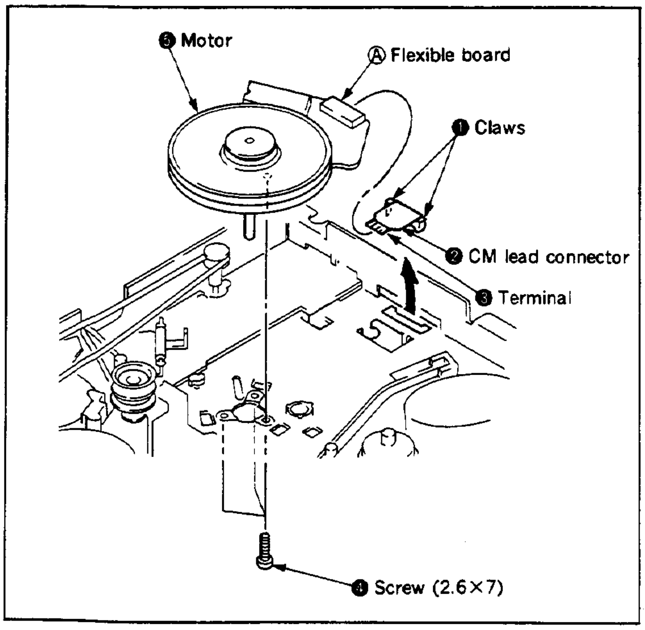


Fig. 3-18

3-15. LOADING PULLEY, LOADING GEAR (Fig. 3-19)

1) With the loading belt put on the loading pulley ❸, unfasten two claws ❷ and remove the loading pulley ❸. (This is to prevent damage to the belt.)
2) Unfasten two claws ❹ and remove the loading gear ❺.

[Precautions on remounting]

- ○ When installing the loading pulley ❸, ensure that claws ❷ are firmly fastened (Fig. A).
- ○ When installing the loading gear ❺, ensure that claws ❹ are firmly fastened (Fig. B).
- ○ If the loading pulley ❸ is applied with screw lock, remove the screw lock and then remove the pulley. In this case, the removed pulley should not be reused. (When replacing, there is no need of applying screw lock.)

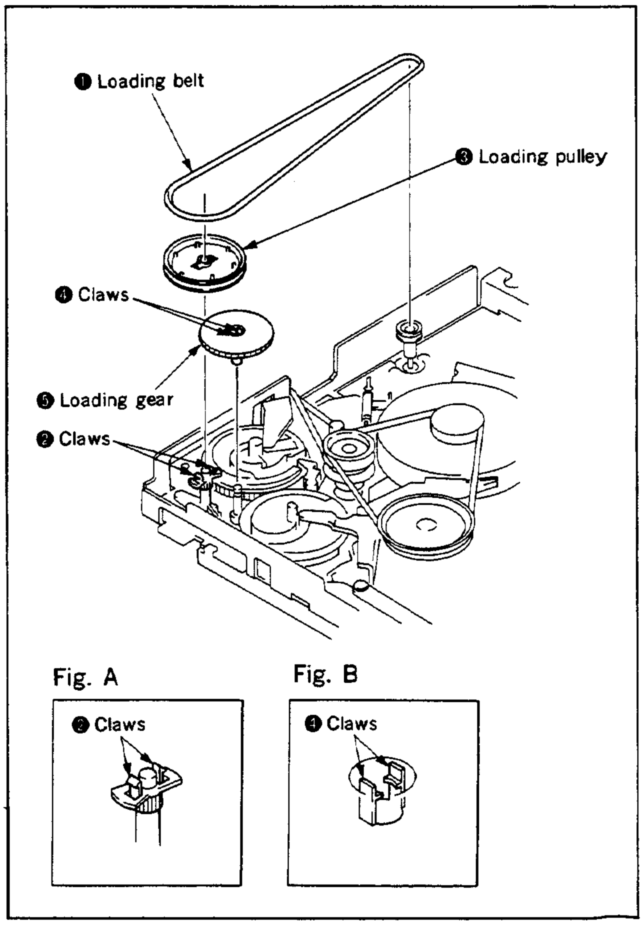


Fig. A

Fig. B

Fig. 3-19

3-16. RE PULLEY ASS'Y, EJECT PULLEY (Fig. 3-20).

1) Remove the loading belt and drive belt as instructed in Sections 3-12 and 3-15.
2) Remove the FL belt ❶.
3) Remove the washer ❷ and pull out the RE pulley ass'y ❸.
4) Remove the washer ❹ and pull out the eject pulley ❺ and breaker spring ❻.

[Precautions on remounting]

- ○ When installing the eject pulley, ensure that the FL belt ❶ is firmly put on the eject pulley (Fig. A).
- ○ Take care not to allow twist and contamination of the FL belt ❶.
- ○ Removed washers should not be reused.

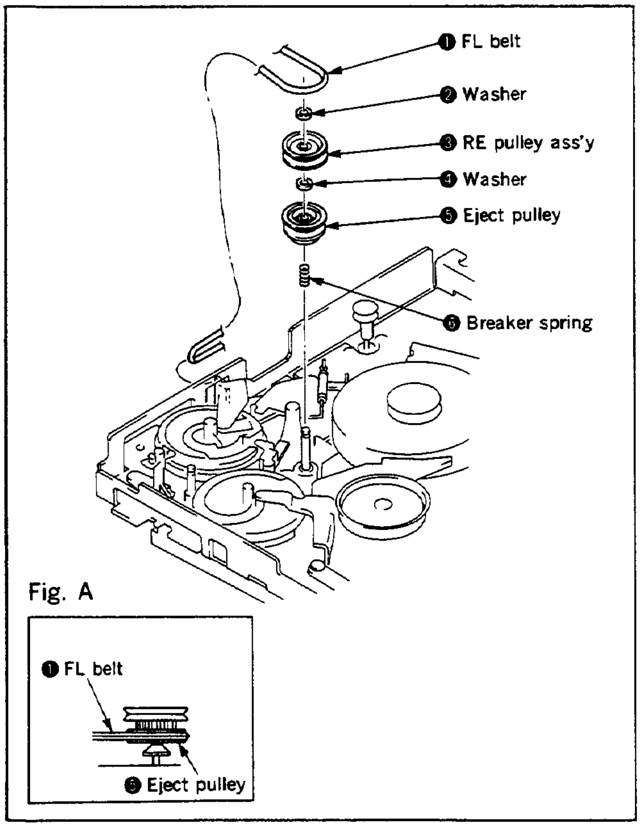

❶ FL belt
❷ Washer
❸ RE pulley ass'y
❹ Washer
❺ Eject pulley
❻ Breaker spring
Fig. A
❶ FL belt
❺ Eject pulley

Fig. 3-20

3-17. BT PULL UP PLATE, BT LEVER, L JOINT PLATE CAULKING AND M SLIDE PLATE (Fig. 3-21)

1) Remove the drive belt as instructed in Section 3-12.
2) Remove the washer ❶.
3) Pull out the BT pull up plate ❷.
4) Remove the plate spring ❸.
5) Pull out the BT lever ❹.
6) Remove the screw ❺ and remove the L gear plate collar ❻.
7) Remove the L lever stopper ❼.
8) Pull out the L joint caulking ❽ and remove the cam roller ❾.

[Precautions on remounting]

- ○ When installing the L joint caulking ❽ to the L cam gear Ⓓ, align the cam roller ❾ with the slot Ⓔ and insert the roller (Fig. A).
- ○ When tightening screw ❺, take care to prevent the screw from projecting and slanting.
- ○ When installing the L joint caulking ❽, align the notch mark of the T loading gear (L) ass'y Ⓖ with the notch mark of the joint and engage the teeth (Fig. B).
- ○ Ensure that the projection Ⓗ is completely inserted into the lever stopper ❼ and that the stopper is not reversely installed (Fig. C).
- ○ Ensure that the plate spring ❸ is secured with the hook Ⓘ.
- ○ When installing the BT pull up plate ❷, ensure that the projection Ⓚ is firmly inserted into the hole Ⓙ.

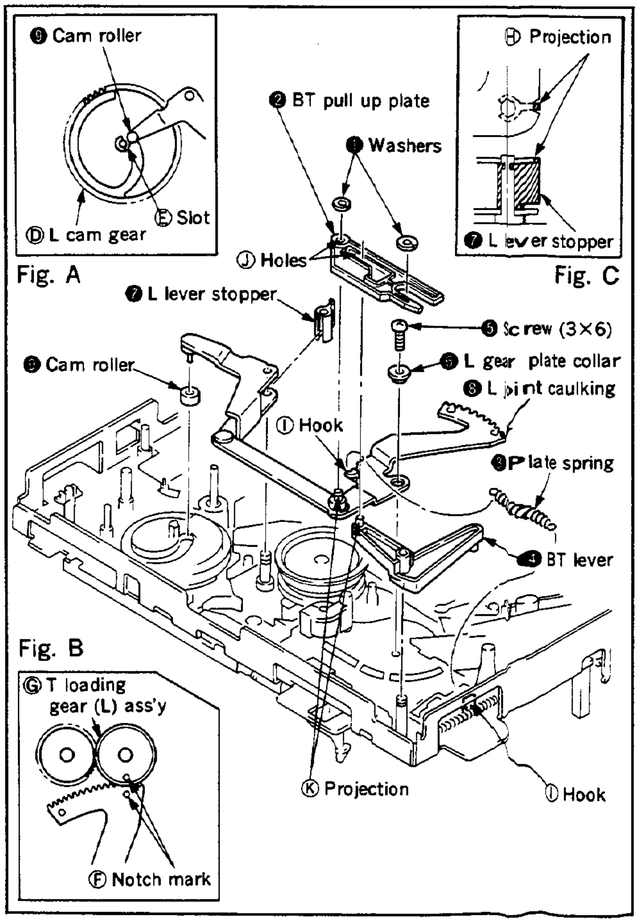

❾ Cam roller
Ⓔ Slot
Ⓓ L cam gear
Fig. A
❷ BT pull up plate
❶ Washers
Ⓙ Holes
Ⓗ Projection
❼ L lever stopper
Fig. C
❼ L lever stopper
❺ Screw (3×6)
❾ Cam roller
❻ L gear plate collar
❽ L joint caulking
Ⓘ Hook
❸ Plate spring
❹ BT lever
Fig. B
Ⓖ T loading gear (L) ass'y
Ⓕ Notch mark
Ⓚ Projection
Ⓘ Hook

Fig. 3-21

3-18. PRESSURE PLATE ASS'Y, BREAKER ARM, P CAM GEAR AND MODE SWITCH (Fig. 3-22)

1) Remove the loading pulley and loading gear as instructed in Section 3-15.
2) Remove the FL belt as instructed in Section 3-16.
3) Turn the L cam gear ❶ in the arrow direction and place the pressure plate ass'y ❷ in threading state.
4) Remove the washer ❸ and pull out the breaker arm ❹.
5) Remove the washer ❺ and pull out the pressure plate ass'y ❷.
6) Unfasten two claws ❻ and pull out the P cam gear ❼.
7) Remove solder Ⓚ and pull out the mode switch ❽.

[Precautions on remounting]

○ When installing the mode switch ❽, align with the hole Ⓒ in the chassis.

○ When installing the P cam gear ❼ and mode switch ❽, align the projection Ⓓ on the mode switch with the slot Ⓔ in the P cam gear (Fig. B).

○ When installing the P cam gear ❼, as illustrated in Fig. A, align the parts Ⓔ, Ⓖ, Ⓗ, Ⓘ and Ⓙ in line.

○ When installing the mode switch ❽, push the switch at its top and solder the switch carefully to prevent its lift.

○ Removed washers should not be reused.

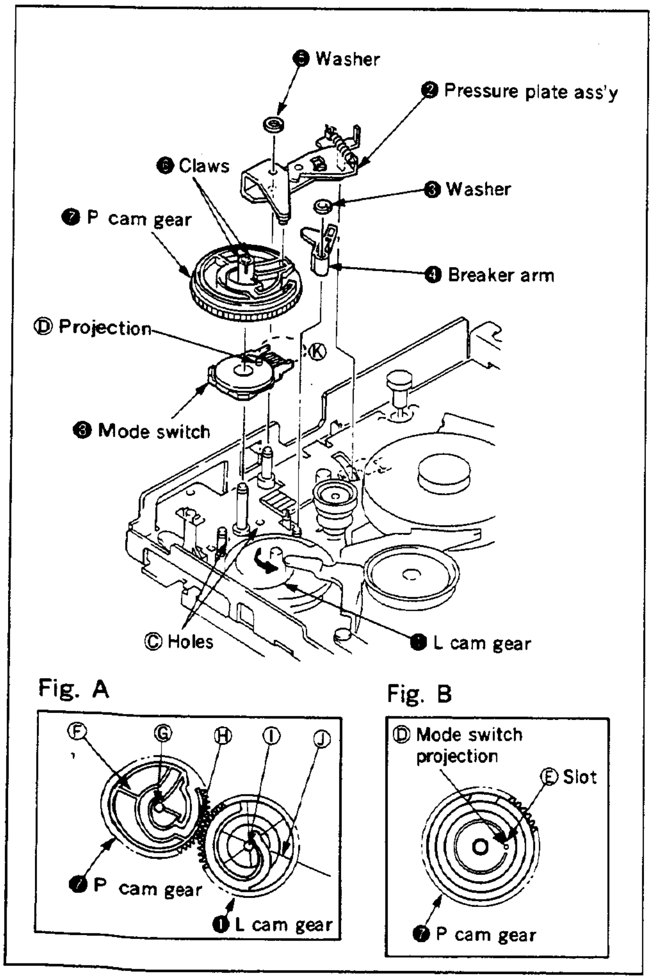

❺ Washer
❷ Pressure plate ass'y
❻ Claws
❸ Washer
❼ P cam gear
❹ Breaker arm
Ⓓ Projection
Ⓚ
❽ Mode switch
Ⓒ Holes
❶ L cam gear
Fig. A
Ⓔ
Ⓖ
Ⓗ
Ⓘ
Ⓙ
❼ P cam gear
❶ L cam gear
Fig. B
Ⓓ Mode switch projection
Ⓔ Slot
❼ P cam gear

Fig. 3-22

3-19. L CAM GEAR, M SLIDE PLATE, RF GEAR ARM ASS'Y (Fig. 3-23)

1) Remove the parts as instructed in Sections 3-11, 3-13, 3-15, 3-16, 3-17 and 3-18.
2) Unfasten two claws ❶ and pull out the L cam gear ❷.
3) Remove the M lever ❸.
4) Slide the M slide plate ❹ in the direction of arrow Ⓒ and remove the plate.
5) Remove two claws ❺ and pull out the RF gear arm ass'y ❻.

[Precautions on remounting]

○ When installing the M slide plate ❹, push the C brake lever ❼ in the direction of arrow Ⓖ and install.

○ When installing the M slide plate ❹, fit the claw Ⓓ into the slot Ⓔ and slide the plate.

○ When installing the L cam gear ❷, align the projections Ⓕ of the M lever and BK release arm (Fig. B).

○ When installing the M lever ❸, the CB return lever Ⓗ should be oriented toward the direction as specified in Fig. B.

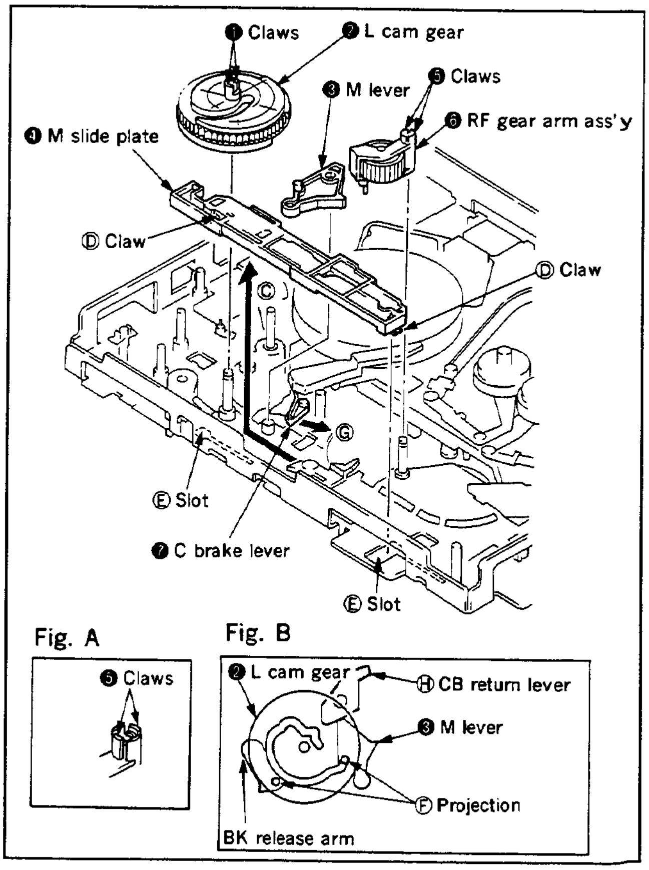

❶ Claws
❷ L cam gear
❸ M lever
❺ Claws
❻ RF gear arm ass'y
❹ M slide plate
Ⓓ Claw
Ⓒ
Ⓓ Claw
Ⓖ
Ⓔ Slot
❼ C brake lever
Ⓔ Slot
Fig. A
❶ Claws
Fig. B
❷ L cam gear
Ⓗ CB return lever
❸ M lever
Ⓕ Projection
BK release arm

Fig. 3-23

3-20. T LOADING GEAR (L, R) ASS'Y (Fig. 3-24)

1) Remove the washer ❶.
2) Unfasten two claws ❷ and pull out the T loading gear (L) ass'y ❸.
3) Remove the spring ❹ and pull out the T loading arm ❺.
4) Remove the washer ❻.
5) Unfasten two claws ❼ and pull out the T loading gear (R) ass'y ❽.
6) Remove the spring ❾ and pull out the T loading arm ❿.

[Precautions on remounting]

- ○ When installing the T loading gear (L, R) ASS'Y ❸ and ❽, align the notch marks and secure springs ❹ and ❾ with the hooks Ⓒ and Ⓓ respectively (Fig. A).
- ○ When installing the T loading gear (L, R) ASS'Y ❸ and ❽, ensure that they are firmly fit on the axles Ⓔ and on the loading bosses Ⓕ.
- ○ When installing the T loading gear (L, R) ass'y ❸,❽, align register marks and have teeth engaged. (Fig. A)

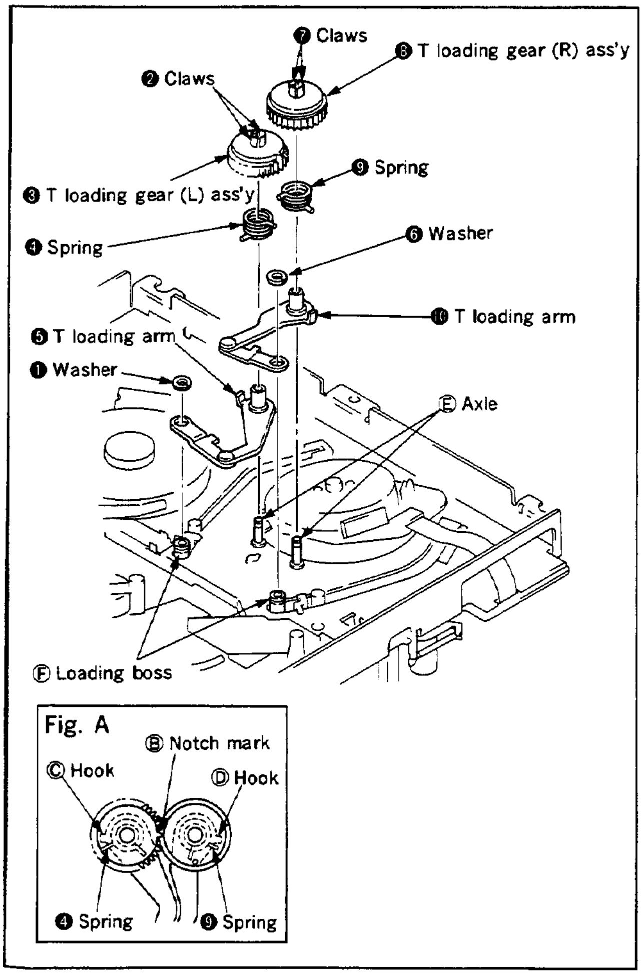

❼ Claws
❽ T loading gear (R) ass'y
❷ Claws
❾ Spring
❸ T loading gear (L) ass'y
❻ Washer
❹ Spring
❿ T loading arm
❺ T loading arm
❶ Washer
Ⓔ Axle
Ⓕ Loading boss
Fig. A
Ⓑ Notch mark
Ⓒ Hook
Ⓓ Hook
❹ Spring
❾ Spring

Fig. 3-24

4. ADJUSTMENT

4-1. TAPE PATH ADJUSTMENT

The "Tape path" refers to the route of the tape from the supply reel disk to the take-up reel disc via the video heads. Each component part of the tape transport system, particularly the surface of parts which make direct contact with the tape must always be kept clean, free of dust, oil, scratches and so forth.

The tape path system is factory preadjusted. When parts of the tape transport system are replaced, be sure to make the required adjustments as precisely as possible in order to ensure stable tape transport.

4-1-1. Tension Arm Position Adjustment (Fig. 4-1)

Purpose : In order to stabilize the contact of the video head with tape, the tension of tape delivered is kept almost constant.

[Adjustment method]

1) Remove the FL ass'y, complete threading without inserting a cassette tape, and place the set in the specified mode (Section 1-3).
2) For adjustment in PLAY mode, first loosen the screw ●. Then use a screwdriver to bend Ⓐ part in the direction of arrow Ⓑ, and adjust so that the spacing between the chassis hook and the tension arm is 0.5mm. After this, tighten the screw ●.
3) For adjustment in REV mode, unplug the power cord and turn the power. Then, place the gear plate in between the S and T reel tables. Use a screwdriver to bend Ⓒ part in the direction of arrow Ⓓ, and adjust so that the spacing between the chassis hook and the tension arm is 4mm.

Note : If the quantity of return is too small, Ⓑ part is lessened. Do not bend part Ⓑ excessively.

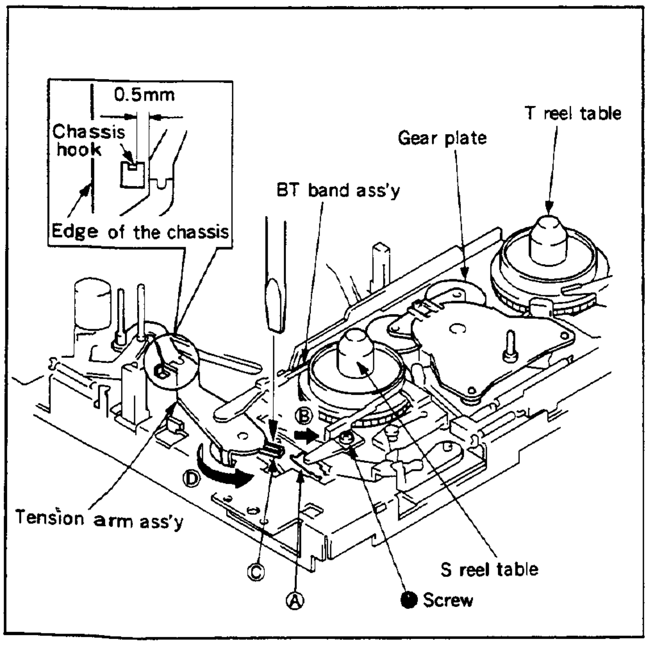


Fig. 4-1

4-1-2. ACE Head Tilt Adjustment (Rough) (Fig. 4-2)

Mode	Stop
Measuring instrument /jig	Master plane Reel disk height jig
Adjusted locations	ACE head, Tilt adjustment screw

[Adjustment method]

1) Remove the FL ass'y, complete threading without inserting a cassette tape, and place the set in the specified mode (Section 1-3).
2) Mount the master plane, then put the reel disk height jig by positioning it to the ACE head.
3) Position the reel disk height jig to the part Ⓐ of the ACE head, then turn the tilt adjustment screw so as to make the head vertical.

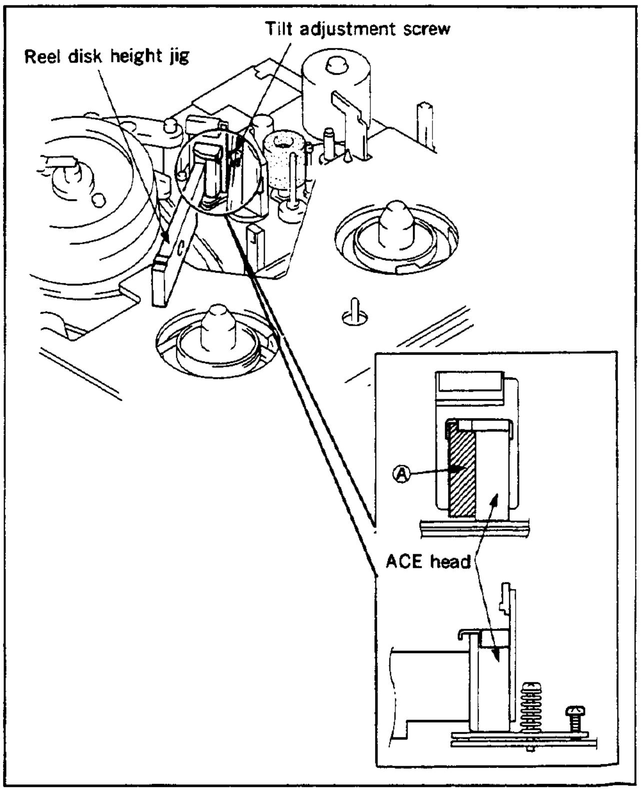


Fig. 4-2

4-1-3. ACE Head Height Adjustment (rough) (Fig. 4-3)

Mode	Playback
Measuring instrument /jig	Blank tape
Adjusted locations	ACE head

[Adjustment method]

1) Remove the FL ass'y, complete threading without inserting a cassette tape, and place the set in the specified mode (Section 1-3).
2) Set a blank tape and allow it to run, then adjust the spacings from the upper and lower ACE heads to tape edges so that the ratio of Ⓐ : Ⓑ=1 : 1.5.

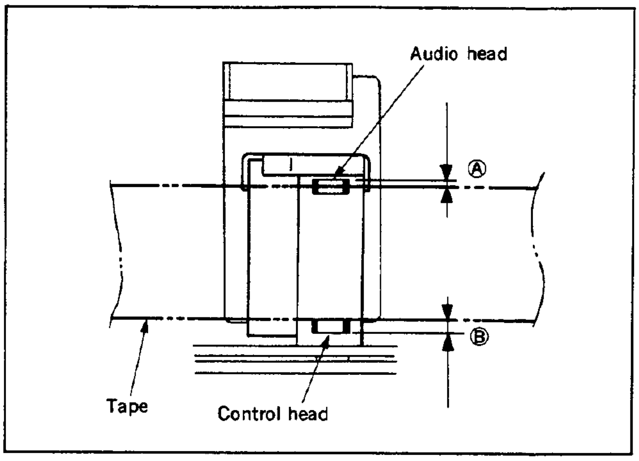


Fig. 4-3

4-1-4. Tension Torque Check

Purpose: To check tension torque and application force acting to the tape takeup and moving parts, which is necessary to ensure that the tape path is smooth and that the basic perfermance of the VTR is satisfied.
If the tape path is not smooth and/or the tape speed is not correct, this check should be performed.

Mode	Each mode of operation with torque tape inserted
Measuring instrument /jig	NTSC VHT-063S torque tape PAL VHT-066S torque tape NTSC VHT-404S torque tape PAL VHT-404S torque tape

Item	Torque tape used	VTR mode of Operation	Reel to be measured	Measurement Value
Playback torque	NTSC VHT-063S PAL VHT-066S	Playback	Takeup reel	100±30g•cm
Back tension torque	NTSC VHT-063S PAL VHT-066S	Playback	Supply reel	47.5±12.5g•cm
REV torque	NTSC VHT-404S PAL VHT-404S	REV	Supply reel	165±25g•cm
CUE torque	NTSC VHT-404S PAL VHT-404S	CUE	Takeup reel	115±45g•cm

Note: Be sure to rotate each torque tape by the minimum of one turn, and read the value at the center portion between the maximum and minimum deflections.

4-1-5. T, S Reel Brake Measurement (Fig. 4-4)

Mode	Each mode without inserting a cassette tape
Measuring instrument /jig	Torque gauge Torque gauge adapter

[S reel brake measurement method]

1) Turn the power ON, select the fast forward mode, and press the STOP button.
2) Fix both torque gauge and torque gauge adapter to the S reel table.
3) Turn clockwise and check that the torque brake is 200g•cm or more.
4) Turn counterclockwise and check that the torque brake is 80 to 170g•cm.

[T reel brake measurement method]

1) Select the rewind mode, and press the STOP button.
2) Fix both torque gauge and torque gauge adapter to the T reel table.
3) Turn clockwise and check that the torque brake is 80 to 170g•cm.
4) Turn counterclockwise and check that the torque brake is 200g•cm or more.
5) Remove both torque gauge and torque gauge adapter.
6) Select the playback mode, then pull out the power cord to run the power OFF.
7) Perform item 2) and check that the torque brake in each of clockwise and counterclockwise directions is 60g•cm ±20g•cm.

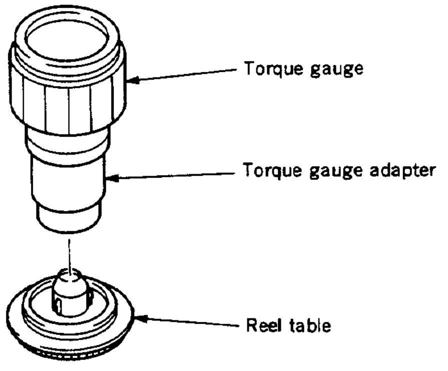


Fig. 4-4

4-1-6. L Block (L, R) Ass'y Position Adjustment (Fig. 4-5)

[Adjustment method]

1) Push the L block (L, R) assemblies in the direction of arrow Ⓐ until they are butted to stop.
2) Push the L block (L, R) assemblies in the direction of arrow Ⓑ and tighten two screws firmly.

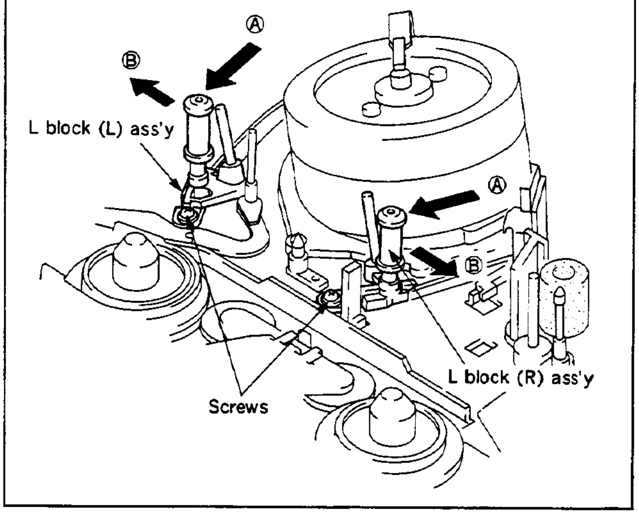


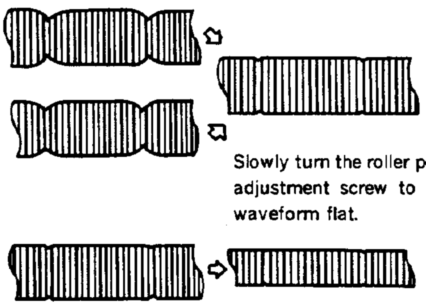
Fig. 4-5

4-1-7. Roller Post (L, R) Height Adjustment (Fig. 4-6)

Mode	Playback
Measuring instrument	HiFi alignment tape (HiFi 400Hz)
Measuring point	CH-1 : RF pin of connector PB for RF board check CH-2 : SWP pin of connector RF for RF board check
Adjustment locations	Roller post height adjustment screw

[Adjustment method]

1) Tracking (playback): Turn off Auto Tracking, and set to the center position (by pressing the tracking buttons ▽ and △ simultaneously).
   (When performing this adjustment after replacing the drum, place Tracking in the position where the RF output is at maximum.)
2) Fully tighten the height adjustment screw and slowly loosen the screw to adjust so that the waveform of the RF output is flat.
3) Tracking buttons (playback): Alternately press ▽ and △.
4) Confirm that drops observed in the RF output are equal at its lead and trail.



Slowly turn the roller post height adjustment screw to make the waveform flat.

Adjust by turning the Tracking control in both directions.

Fig. 4-6

4-1-8. ACE Head Tilt Adjustment (Precision) (Fig. 4-7)

Mode	Playback
Signal	Alignment tape (JVC-MH-1 1kHz)
Measuring instrument /jig	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjustment screw Height adjustment screw Tilt adjustment screw

[Adjustment method]

1) While in FWD mode, adjust so that there is no curl or lift on the lower tape guide flange by using the azimuth adjustment screw.
2) In alternate adjustments, slightly adjust the azimuth, height so that the audio output is maximized and that is waveform is made flat (minimized in fluctuation).

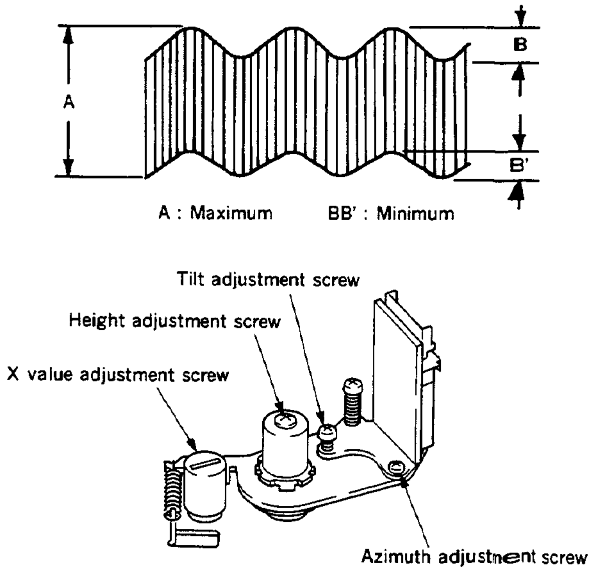


Fig. 4-7

4-1-9. X-Value Adjustment

Purpose: To assure compatibility with other VTR's.

Note: Before performing this adjustment, Tracking Preset Adjustment must be always performed. (Refer to the Service Manual.)

Turn off Auto Tracking and set to Manual mode.

Mode	Playback
Signal	HiFi alignment tape (HiFi 400Hz) or alignment tape (JVC-MH-1 1kHz)
Measuring instrument /jig	Oscilloscope
Measuring point	CH-1 : Pin RF of connector PB for RF board check CH-2 : SWP pin of connector RF for RF board check (Observe on the CHA head.)
Adjustment locations	X-value adjustment screw

[Adjustment method]

○ Adjustment by HiFi alignment tape

When the tracking is set at the center position (by pressing the [▽] and [△] keys simultaneously), adjust the RF output to maximum.

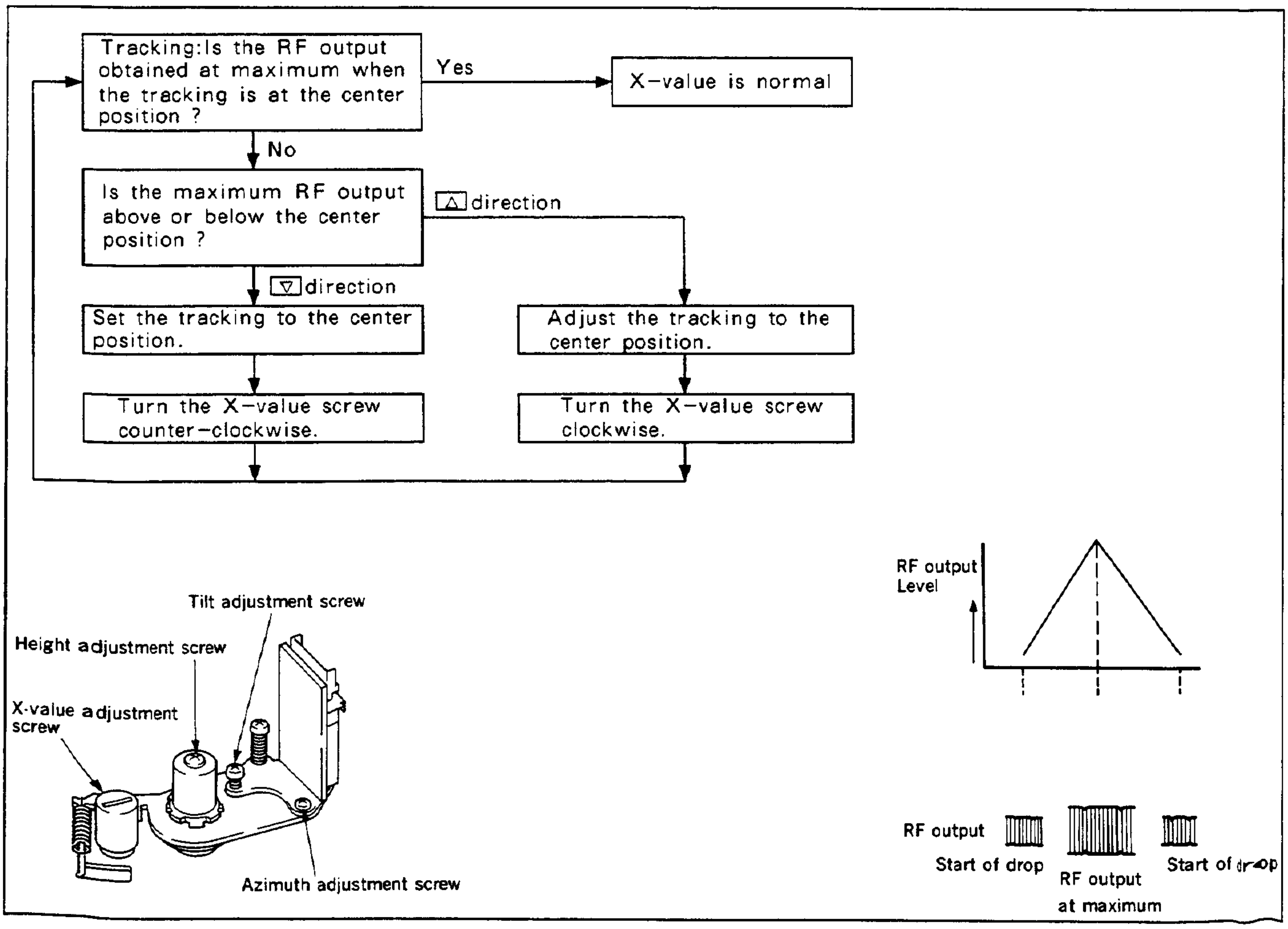

Tracking: Is the RF output obtained at maximum when the tracking is at the center position ?
Yes
X−value is normal
No
Is the maximum RF output above or below the center position ?
[△] direction
[▽] direction
Set the tracking to the center position.
Adjust the tracking to the center position.
Turn the X−value screw counter−clockwise.
Turn the X−value screw clockwise.
Tilt adjustment screw
Height adjustment screw
X-value adjustment screw
Azimuth adjustment screw
RF output Level
RF output
Start of drop
RF output at maximum
Start of drop

Fig. 4-8

○ Adjustment by Alignment tape (JVC-MH-1 1kHz) (Fig. 4-9)
Adjust the X-value adjuster screw so that maximum RF output is obtained and also that the RF output drops to the same position on pressing the respective ▽ and △ buttons while the tracking is set at the center position.

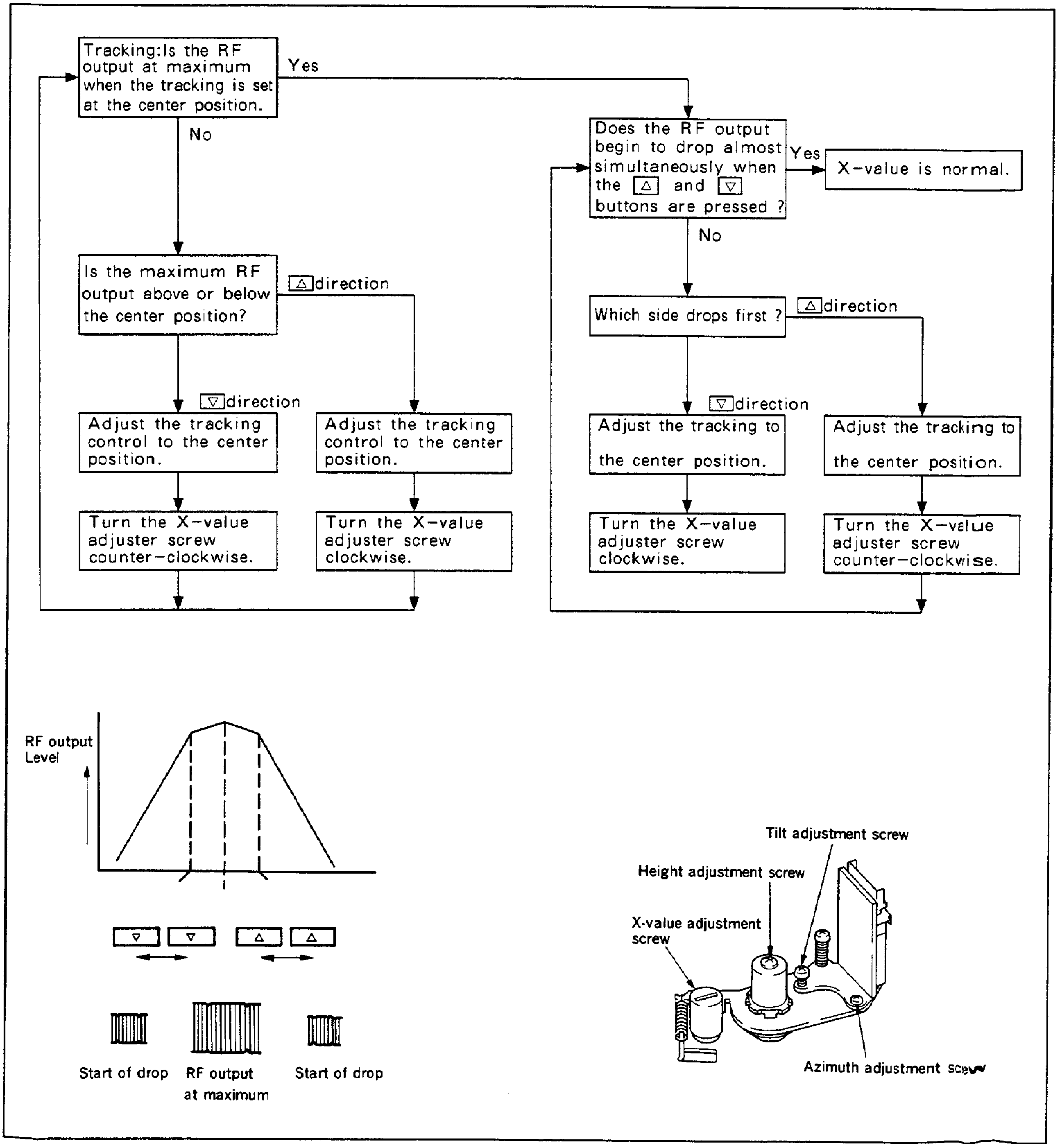

Tracking:Is the RF output at maximum when the tracking is set at the center position.
Yes
No
Is the maximum RF output above or below the center position?
△direction
▽direction
Adjust the tracking control to the center position.
Adjust the tracking control to the center position.
Turn the X-value adjuster screw counter-clockwise.
Turn the X-value adjuster screw clockwise.
Does the RF output begin to drop almost simultaneously when the △ and ▽ buttons are pressed ?
Yes
X-value is normal.
No
Which side drops first ?
△direction
▽direction
Adjust the tracking to the center position.
Adjust the tracking to the center position.
Turn the X-value adjuster screw clockwise.
Turn the X-value adjuster screw counter-clockwise.
RF output Level
▽
▽
△
△
Start of drop
RF output at maximum
Start of drop
Tilt adjustment screw
Height adjustment screw
X-value adjustment screw
Azimuth adjustment screw

Fig. 4-9

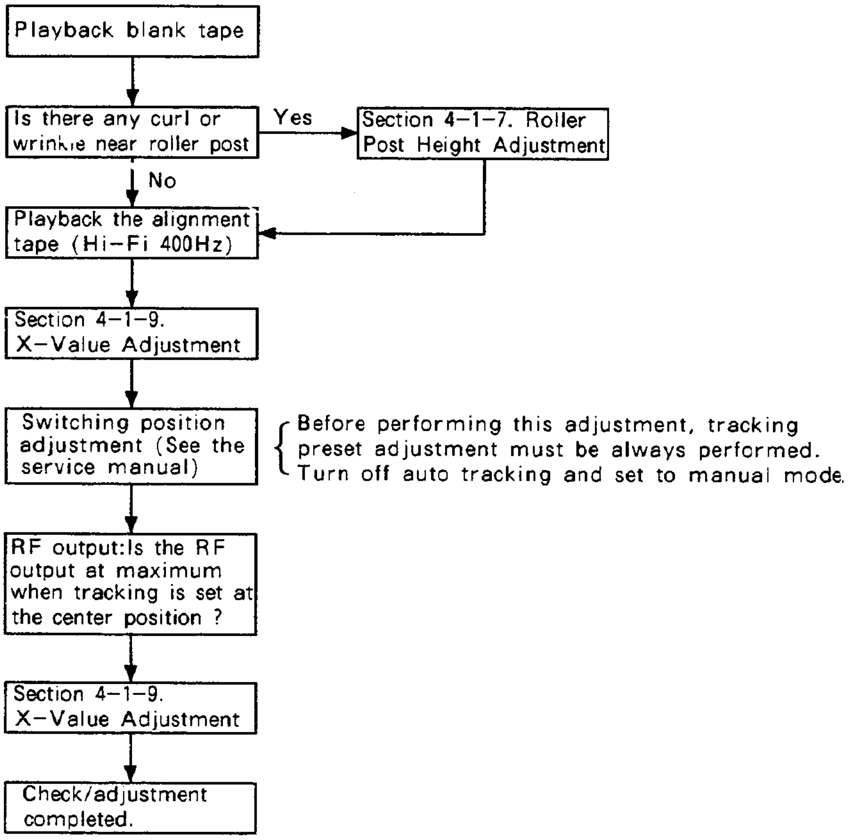
4-1-10. Adjustments after Replaceing the Drum (Video head)

Purpose: Co-relative height, X-value and other factors of the drum will deviate from those of the guide roller. If the drum in replaced properly, these deviations are extremely small.

Precaution: Turn off the auto tracking and set the manual tracking mode.

Mode	Playback
Signal	Alignment tape (JVC-MH-1 1kHz), blank tape
Measuring instrument /jig	Oscilloscope
Measuring point	CH-1 : PB RF pin of connector for RF board check CH-2 : RF SWP pin of connector for RF board check
Adjustment locations	Roller post (Section 4-1-7) X-value (Section 4-1-9) Switching position (See the Service Manual) Before performing this adjustment, Tracking Preset Adjustment must be always performed. Turn off Auto Tracking and set to Manual mode.

[Adjustment method]


Playback blank tape
Is there any curl or wrinkle near roller post
Yes
Section 4–1–7. Roller Post Height Adjustment
No
Playback the alignment tape (Hi–Fi 400Hz)
Section 4–1–9. X–Value Adjustment
Switching position adjustment (See the service manual)
RF output:Is the RF output at maximum when tracking is set at the center position ?
Section 4–1–9. X–Value Adjustment
Check/adjustment completed.

Before performing this adjustment, tracking preset adjustment must be always performed. Turn off auto tracking and set to manual mode.

4-1-11. RG Post Tilt Adjustment (Fig. 4-10)

1) Take up tape in either playback or CUE mode and then enter REV mode.
2) Slowly tighten the tilt adjustment screw and allow some curl to appear on the exit guide lower flange. Then, slowly loosen the screw until there is not any wrinkle or curl.

4-1-12. Regulation Direction Check (Fig. 4-10)

[Check method]

1) Play back raw tape and set to the CUE/REV mode. check the following places to see if there is any curl or wrinkle.

A	FE head	E	Tape guide
B	Entrance roller post	F	Capstan shaft
C	Entrance bag unit	G	RG post
D	Exit roller post		

Note : If curl or wrinkle cannot be removed, perform Adjustments from 4-1-6. again.

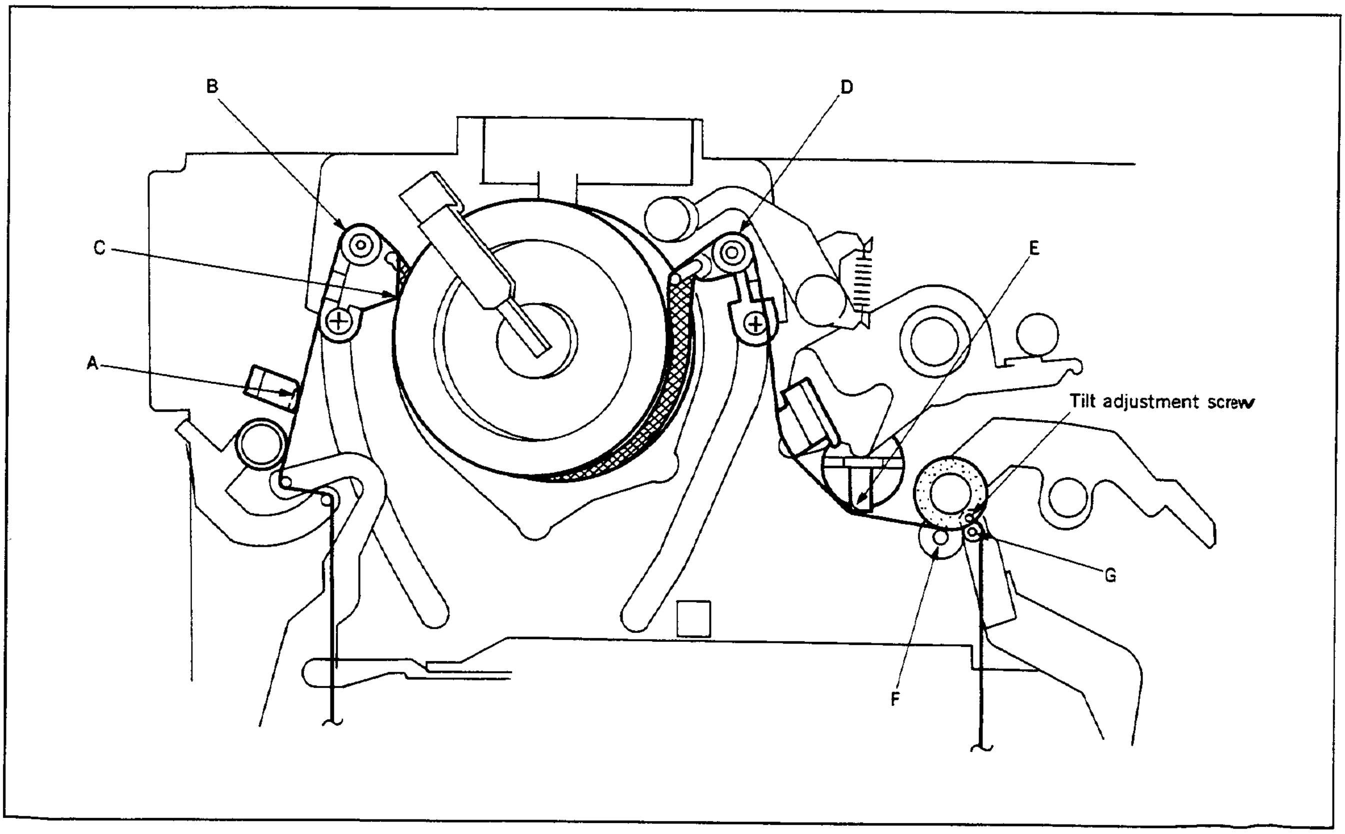


Fig. 4-10